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PATENT AND TRADEMARK OFFICE NOTICES

Recombinant DNA

Suspension of Accelerated Processing of Patent Applications for Recombinant DNA Research Inventions

On January 10, 1977, the Patent and Trademark Office issued a notice, published in the Federal Register of January 13, 1977, 42 FR 2712–2713, which provided for the accelerated processing of patent applications for inventions relating to Recombinant DNA, including those that contribute to safety of research in the field.

In order that the Federal Interagency Committee for Recombinant DNA Research may consider recommendations concerning research conducted by the private sector in this field, that part of the referenced notice dealing with accelerated processing of patent applications for Recombinant DNA research inventions is suspended until further notice.

That part of the referenced notice dealing with accelerated processing of patent applications relating to safety of research in this field will remain in force.

Dated: March 3, 1977.

RENE D. TEGTMEYER,
Acting Commissioner of Patents and Trademarks.

Approved: March 3, 1977.
BETSY ANCKER-JOHNSON,
Assistant Secretary for Science and Technology.
[FR Doc. 77-6908; Filed 3-8-77; 8:45 am]

Proposal for Distribution of Trademark Section 8 and 15 Index Cards to Private Firm

The Patent and Trademark Office received a request from TCR Service, Inc. for index cards which indicate the acceptance of an affidavit under Section 8 and the acknowledgment of an affidavit under Section 15. These cards are currently used by the Patent and Trademark Office to update the Search Room records and then the cards are destroyed.

TCR Service, Inc. has agreed that if the Patent and Trademark Office will provide them with the cards, they will maintain the cards for a six month period after receipt and make them available without charge to any person desiring to use them. After six months, the cards will be destroyed.

Any person having an objection to this proposed procedure should notify the Commissioner of Patents and Trademarks within 60 days from the date of this notice. After that time, the Patent and Trademark Office will announce their decision.

BERNARD A. MEANY,
Assistant Commissioner for Trademarks.

Mar. 15, 1977.

Registration to Practice

The following are names of persons applying for registration to practice before the United States Patent and Trademark Office. Information tending to affect the eligibility of said applicants on moral, ethical, or other grounds, should be furnished the Commissioner of Patents and Trademarks on or before May 6, 1977.

Carter, Robert S., 5600 Whitehaven, Bellaire, Tex. 77401
Gaston, Leslie H., 2500 Q St. NW., Washington, D.C. 20007
Hickey, Bryan F., 109 Sandy Creek Ct., Rte, 4, Greer, S.C. 29651
Hogeboom, Robert C., 19 Fourwinds Dr., #1002, Downsview, Ontario, Canada
Permut, Steven L., McGarry & Waters, Frey Bldg., Grand Rapids, Mich. 49503
Schutzman, Lee A., 5009 Linette Lane, Annandale, Va. 22003
Weir, Stanley M., P.O. Box 365, Santa Clara, Calif. 95052
Weiser, Morris L., 3246 Bedford Ave., Brooklyn, N.Y. 11210

LUTRELLE F. PARKER,
Chairman, Committee on Enrollment.

Trademark Manual of Examining Procedure, 1st Ed.

CHANGE NOTICE
Series No. 3–1
(Follows Change 1–3)

References: TMEP sections 602, 602.01, 602.02, 602.03 and 603 — March 15, 1977

PRACTICE BEFORE, AND CORRESPONDENCE WITH, THE PATENT AND TRADEMARK OFFICE

The sections referred to above are being re-written in their entireties, with considerable matter being added in view of the rule changes effective February 1, 1976. The sections as re-written read as follows:

602 *Persons who may practice before Office in trademark matters.*

Rule 2.13. Persons who may practice before the Patent and Trademark Office in trademark cases.

(a) Attorneys at law: Any person who is a member in good standing of the bar of the Supreme Court of the United States or of the highest court of any State, Territory, or the District of Columbia, and is not under any order of any court suspending, enjoining, restraining, disbarring, or otherwise restricting him in the practice of law, may represent others before the Patent and Trademark Office in trademark cases. No application for recognition to practice in trademark cases by attorneys at law is required.

(b) Non-lawyers: Persons who are not attorneys at law as specified in paragraph (a) of this rule are not recognized to practice before the Patent and Trademark Office in trademark cases, except that persons not attorneys at law who were recognized to practice before the Patent and Trademark Office under these rules prior to January 1, 1957, will be recognized as agents to continue practice in trademark cases in the Patent and Trademark Office.

(c) Foreign attorneys and agents: Any foreign attorney or agent not a resident of the United States who shall file proof to the satisfaction of the Commissioner that he is registered and in good standing before the patent or trademark office of the country in which he resides and practices, may be recognized to represent applicants located in such country before the United States Patent and Trademark Office in the presentation and prosecution of trademark applications: *Provided,* That the patent or trademark office of such country allows substantially reciprocal privileges to those permitted to practice in trademark cases before the United States Patent and Trademark Office. Such recognition shall continue only during the period that the conditions specified obtain.

(d) Recognition of any person under this rule is not to be construed as sanctioning or authorizing the performance of any acts regarded in the jurisdiction where performed as the unauthorized practice of law.

(e) No persons other than those mentioned in paragraphs (a), (b), and (c) of this rule will be permitted to practice before the Patent and Trademark Office in trademark cases. Any person may appear for himself, or for a firm of which he is a member, or for a corporation or association of which he is an officer and which he is authorized to represent, if such person, firm, corporation, or association is a party to the proceeding.

(f) Persons otherwise entitled to be recognized to practice under this rule may, nevertheless, be refused recognition for cause.

No application for recognition to practice (that is, to represent others) in trademark cases before the Office is necessary. No examination is given by the Office for eligibility to practice in trademark cases, nor does the Office maintain any register to list persons entitled to practice in connection with trademark cases. Attorneys at law may represent others (that is, practice) before the Patent and Trademark Office

in connection with trademark matters on the basis of their being attorneys at law. Non-lawyers are not permitted to practice except under particular circumstances as specified in Rule 2.12. Firms may not practice as firms or by firm name; only individual persons are entitled to be recognized to practice and represent others.

It is desirable from the viewpoint of both the applicant and the Office that persons who represent parties in trademark cases be attorneys at law, and the rules are designed with that in mind. Use of the term "agent" in connection with a representative in a trademark case is only appropriate under exceptional circumstances as specified in Rule 2.12.

602.01 *Power of attorney not required for attorneys at law.*

It is not necessary for an attorney at law to file a power of attorney or any other special authorization in a trademark case. An attorney at law who is satisfactorily identified as such will be accepted as a representative of a party in a trademark matter on the basis of his being an attorney at law.

If an attorney at law files a power of attorney from the party he represents, such power will be accepted; however, to be acceptable as a power of attorney, the power must identify an individual attorney or individual attorneys by their names, not merely specify the name of a firm of attorneys. A power which specifies the name of a firm of attorneys will not be regarded as a power by the Office; it will merely be treated as a mailing address and a direction that correspondence be sent to such firm at its address. (See TMEP section 603.) The reason for this practice is that an attorney at law in his capacity as a representative is held responsible for his actions under the Code of Professional Responsibility of the American Bar Association, and such Code has applicability to individual persons, not to "firms." (See TMEP section 602.02.)

602.02 *Standards of Conduct, and Signature and Certificate of Attorney.*

Rule 2.13. Professional conduct. Attorneys and other persons appearing before the Patent and Trademark Office in trademark cases must conform to the standards of ethical and professional conduct set forth in the Code of Professional Responsibility of the American Bar Association as amended February 24, 1970, insofar as such code is not inconsistent with these rules. A copy of the said code is available for inspection in the Office of the Solicitor, U.S. Patent and Trademark Office, Room 11C04, Building 3, Crystal Plaza, 2021 Jefferson Davis Highway, Arlington, Va. Copies of the code are available upon request to the American Bar Center, 1155 East 60th Street, Chicago, Ill. 60637.

Rule 2.15. Signature and certificate of attorney or other representative. Every paper filed by an attorney at law or other person representing an applicant or party to a proceeding in the Patent and Trademark Office must bear the signature of such attorney at law or other person except those papers which are required to be signed by the applicant or party. The signature of an attorney at law or such other person to a paper filed by him, or the filing of any paper by him, constitutes a certificate that the paper has been read; that its filing is authorized; that to the best of his knowledge, information, and belief there is good ground to support it; and that it is not interposed for delay.

By amendment of Rule 2.13 as of July 2, 1971, the Code of Professional Responsibility of the American Bar Association is designated by the Office as the standard of conduct for those practicing before the Office in trademark matters. (See 36 F.R. 12616; 890 O.G. TM 60.) The purpose of using the code is to provide a definite and uniform standard of conduct for practitioners before the Office; the code in conjunction with the provision of Rule 2.15 that an attorney or other representative shall sign and thereby certify each action he takes, will eliminate uncertainty as to the person taking the action and the responsibility of such person.

602.03 *Revocation or withdrawal of authorization.*

Rule 2.19. Revocation of power of attorney or of other authorization to represent. Authority to represent an applicant or a party to a proceeding may be revoked at any stage in the proceedings of a case upon notification to the Commissioner; and when it is so revoked, the Office will communicate directly with the applicant or party to the proceeding or with such other qualified person as may be authorized. The Patent and Trademark Office will notify the person affected of the revocation of his authorization.

If a proper written power of attorney has been filed in a trademark application, it may be revoked by applicant by a written revocation, and in such event the Office will acknowledge the revocation and will not thereafter recognize such attorney in that case unless he is again specifically appointed.

However, either with or without a power of attorney on file, a change in representation can be made by an action which is signed by a different properly authorized person plus a request to change the address for correspondence. In this way, decisions as to representation, which are primarily the responsibility of the applicant and his attorney or other representative, are transmitted to the Office without any action normally being needed by the Office. See TMEP section 603.

An attorney at law or other representative can withdraw from representation of an applicant in an application, but such withdrawal should not be done in a manner which would prejudice applicant.

603 *Correspondence, with whom held.*

See Rule 2.18. For amendment of such rule effective February 1, 1976, see 40 F.R. 6361, Feb. 11, 1975 (932 O.G. TM 40, Mar. 11, 1975) and 41 F.R. 756, Jan. 5, 1976 (943 O.G. TM 2, Feb. 3, 1976).

When a trademark application is filed, an address (consisting of a name and a street address) where correspondence from the Office will be sent, is placed on the face of the file wrapper by a clerk in the Office. Correspondence will be sent to any address of applicant's selection, and when the name and address of an attorney appears in the papers, it will be assumed that applicant wishes to receive correspondence from the Office concerning the application at that address. If an application is accompanied by a transmittal letter on a letterhead which identifies an attorney or a firm of attorneys, the name and address on the letterhead will be used as the correspondence address, unless there is included in addition a specific request to "Send correspondence to (a named individual)." If an application is written on professional paper which identifies the name and address of an attorney or a firm of attorneys, such name and address will be placed on the file wrapper as applicant's correspondence address. If a power of attorney designates an attorney or attorneys and an address, or if a form which has the appearance of a power of attorney designates the name and address of a firm of attorneys, such designation will be used as the correspondence address. These entries are made upon the filing of an application, without the signature of the attorney, since an application is a document which must be signed by the applicant and is not an action of the attorney. See Rule 2.15.

The correspondence address which is placed on the file wrapper when the application is filed is not changed unless there is a written request by applicant or his representative to do so. If a power of attorney has been filed, a subsequently filed power of attorney will be regarded as a written request to change the address, even if there is no revocation of the power; but in other situations, specific language is needed which can reasonably be interpreted to be a request to change the address. See TMEP section 602.03. The Office does not acknowledge requests to change the correspondence address; the change is merely entered on the file wrapper by a clerk in the Office. The filing of "associate powers of attorney" or similar papers has no effect; such papers do not alter the correspondence address already established, and such papers are not acknowledged by the Office.

During the prosecution of a trademark application, every action must be signed by an individual attorney or other authorized representative using his individual name, although a firm name might also appear on the action. Any action which is so signed will be accepted regardless of whether the person who has signed is the same person who signed other actions or is different from persons who have signed other actions. Even though the signer is different, however, the Office will continue to send correspondence to the mailing

address already established unless there is a written request to change such address. Thus, if papers are filed by more than one attorney or other representative, the Office will reply but will send the reply to the mailing address already established until there is a written request to change. Double correspondence will not be undertaken either with applicant and applicant's attorney or with more than one attorney or representative. Where circumstances call for it, the Examiner may designate an extra copy of a communication to be sent to a second person, but this procedure will not be repeated on the next communication.

The only action an Examiner need take in relation to attorneys or representatives is to assure that the person who signs each action either is an attorney at law (which normally can be assumed from the attorney's own statement or indentification) or is another proper type of party with written authorization. See Rule 2.17.

BERNARD A. MEANY,
Assistant Commissioner for Trademarks.

Mar. 15, 1977.

Trademark Manual of Examining Procedure, 1st Ed.

CHANGE NOTICE

Series No. 3–2
(Follows Change 3–1)

References: TMEP sections 804.02, 804.03, 804.04, 804.04(a), 804.04(b), and 804.04(d). March 15, 1977

IDENTIFICATIONS, AND THE INTERNATIONAL LIST OF GOODS AND SERVICES

The sections referred to above are being rewriten in their entireties in order to clarify the manner in which the International List of Goods and Services is to be used in connection with evaluation of identifications of goods and services in trademark applications and to elaborate on broadness of terms in identifications. The subject matter of the Notice Published in OFFICIAL GAZETTE of August 3, 1971,* dealing with the use of the international list, which was set forth in original TMEP section 804.03, is incorporated in these rewritten sections, and that Notice is superseded by these sections as rewritten.

The re-written sections read as follows:

804.02 *Broadness of terms used in specifying goods and services.*

When setting forth the goods or services in an application, the applicant frequently likes to choose broad terms by which to identify the goods or services. The Office also prefers broad terms, when the terminology is appropriate, in order to avoid long lists of detailed items. Long lists are a burden to the Office to handle and check and they are expensive to print; also they may be unfair to applicants because of being subject to inadvertent omissions and frequent changes in contents. On the other hand, the basis of an application is use of the mark on the goods or services set out in the application. The requirement for use of the mark is not necessarily violated by broad terms, for when a mark is used on a number of items which make up a homogeneous group, a term which identifies the group as a whole would be understood as encompassing products of the same general type which are commercially related. This being true, then, even though a term is broad, it will be known with reasonable certainty what products are intended to be covered, and it will be reasonable from a commercial viewpoint to consider that the mark has been used for all the related products which fall in the designated group. Using this approach, in *In re Port Huron Sulphite & Paper Co.*, 120 USPQ 343 (TT&A Bd. 1959), the term "paper" was approved because of actual use of the mark on various types of papers; in *In re Armstrong Cork Company*, 180 USPQ 335 (TT&A Bd. 1973), "furniture" was not considered too broad to assume use as to all items normally covered by such term; and in *In re Dynamit Nobel AG*, 169 USPQ 499 (TT&A Bd. 1971), "ammunition" was permitted because its scope was assumed to be understood.

In considering all identifications, but especially the appropriateness of broad terms, the Examiner must consider the following guidelines:

(1) A term which clearly includes particular items which are classified in more than one class is not acceptable. (For example, "artists' materials.")

(2) A term which is too indefinite to enable proper examination to be made would not be acceptable. (For example, "metallic parts.") In such a situation the Examiner may seek further information under Rule 2.61(b). See TMEP sections 1105.02 and 1105.02(a).

(3) An identification would be unacceptable if it were inconsistent with the goods or services disclosed by the specimens, or if the ordinary meaning of the identification were at variance with the goods or services disclosed by the specimens or otherwise disclosed by the record. (For example, "decalcomanias" are not adequately identified by the term "publications." See also *Ex parte Consulting Engineer Publishing Co.*, 115 USPQ 240 (Comr. Pats. 1957).)

(4) Wording included in a mark could require limitation of the identification. (For example, "beer" may not be included in the identification where the mark is "Newark 'Olde Town' Ale." *Ex parte The Consumers Brewing Co.*, 55 USPQ 426 (Comr. Pats. 1942). But see also TMEP section 404.04(e) for circumstances under which limitation would not be necessary.)

(5) The mere fact that a decision (or decisions) holds that a likelihood of confusion exists in relation to certain narrowly identified items does not necessarily mean that all broad identifications which would include such items must be amended to the specific narrow items mentioned in the decision or decisions.

(6) An identification which can be understood when read in association with the title of the class in which it is placed and is otherwise satisfactory, should not be required to be further qualified by amendment. (For example, "mufflers" in the clothing class would not require further modification to indicate that articles of clothing are intended; similarly the term "house organ" in the class for printed publications would not need further qualification.) See TMEP sections 1401.07 and 1401.08.

With broad identifications, as with any identification which includes more than one item, there is a question as to the amount of proof (normally by way of specimens) which is necessary to assure the Examiner that the mark has been used on "all" the items in the application. See TMEP sections 808.01(a) and 804.06. It has never been the practice of the Office to require specimens of use for every item in an application. Consideration is given to the fact that applicant has stated that the facts set forth in the application are true, and also to the degree of commercial relationship between the products. With broad terms which identify a group of products which are similar and consistent in their commercial character, it is reasonable to assume that even if the mark has not been used on every item in the group, use on some of the items would be likely to result in confusion with regard to the other items. For a closely related group, a specimen on one item of the group would be sufficient. As the closeness of the relationship becomes less certain, specimens of use on more than one item might be necessary to be persuasive of generalized use. The nature of the mark also may be considered, for it is so well known as not to require proof that "house" marks are in fact placed on all the goods which a company produces, whereas a "product" mark which is appropriate only for a specific commodity is used only on that commodity.

The appropriateness of any broad identification depends upon the facts in the particular case, but use of terms as broad as the circumstances justify is desirable. When an ap-

(NOTE.—These sections as changed will be incorporated into the Manual text in Rev. 3 of the Manual.)

*This Notice as originally published was entitled "Preface to the Trademark O.G. Notices," with a sub-headed portion entitled "Identification of Goods and Services in Trademark Applications." The Notice was first issued under data of June 16, 1971 and first printed in 36 Fed. Reg. 13232, July 16, 1971, and in the OFFICIAL GAZETTE of August 13, 1971 (889 O.G. TM 2). That portion of the Notice sub-headed "Identification of Goods and Services in Trademark Applications" was re-issued under date of January 13, 1972 with an amendment of the part pertaining to fees for the international list, and as amended was reprinted in the OFFICIAL GAZETTE of February 8, 1972 (895 O.G. TM 54).

propriate broad term is available, it should be used by applicant and accepted by the Examiner.

Any uncertainly as to the acceptability of the terms in identifications should be first discussed with the Division Supervisor, and if unresolved, should be submitted for the decision of the Director of the Trademark Examining Operation, who may delegate the everyday responsibility for resolving these questions to the Examiner who is responsible for classification matters. The Classification Examiner is also authorized to discuss with Supervisors and Examiners situations which the Classification Examiner observes during review of the applications which have been forwarded for publication. A list of terms which as a result of these procedures have been considered to be acceptable under suitable circumstances, will be compiled and made available to Examiners and the public, whenever practicable.

Final refusals based on a requirement concerning identifications of goods or services must be reviewed by the Director of the Trademark Examining Operation so as to achieve the highest uniformity.

804.03 *International alphabetical list as guide.*

In furtherance of the guidelines set forth in TMEP sections 804.01 and 804.02, Examiners should use as a reference for identifications of goods and services, the items listed in the Alphabetical List of Goods and Services which is contained in the volume entitled "International Classification of Goods and Services to Which Trademarks Are Applied" (published by the World Intellectual Property Organization, also known as WIPO). The items in the list should be accepted as identifications whenever circumstances permit. A great many of the items will be sufficiently definite to be acceptable. However, in view of the fact that the terms in the present list were developed essentially as a basis for classifying goods and services and not from the viewpoint of proper form to serve as identifications of specific goods and services, some items may not be sufficiently definite. The list itself indicates at its beginning that it should not be assumed that every item will be a suitable identification as it stands.

The primary purpose of using the international Alphabetical List as a reference for identifications is to provide a published source of names of goods and services to which applicants can resort with some degree of assurance that the terms will be accepted by Examiners in the Patent and Trademark Office. The availability of such a source should help reduce and simplify the requirements of Examiners as to identifications of goods and services, and should be of assistance in establishing justifiably broad identifications, thereby shortening prosecution time and reducing unconstructive discussion.

The principles for determining the degree of definiteness needed in identifications in order to permit proper examination (see TMEP sections 804.02 and 804.04) are to be applied to all terminology whether it is in the international Alphabetical List or not. However, items which appear in the international Alphabetical List should be given the benefit of any doubt and should be accepted whenever that can reasonably be done, in the interest of establishing the list as a source of satisfactory identifications.

See *In re Safeway Products Inc.*, 192 USPQ 155 (TT&A Bd. 1976); *In re Air Products and Chemicals, Inc.*, 192 USPQ 84 (TT&A Bd. 1976), on reconsideration 192 USPQ 157 (TT&A Bd. 1976).

804.04 *Need for greater definiteness in identifications of goods and services.*

Whenever after applying the guidelines in TMEP sections 804.01, 804.02 and 804.03 as to broadness in identifying goods and services, the Examiner considers it necessary to request a more definite identification, the Examiner should explain clearly but concisely the reason for the request. See TMEP sections 1105.02 and 1105.02(a). Some well-recognized reasons for requesting a more definite identification are set out in the sub-sections of this section.

804.04(a) *More than one class involved.*

If a broad term used by applicant clearly includes particular items which are classified in more than one class in the Classification of Goods and Services, the term must be amended to limit the items to one class. An example of such a term would be "artists' materials." Another example would be the designation "tables," which would include such diverse and differently classified types as operating tables, draftsmen's tables and dining tables. However, the conclusion that a term would clearly include particular items which are classified in more than one class should be reasonable in the light of commercial relationships between goods or services. For example, see the terms "paper," "furniture" and "ammunition," in *In re Port Huron Sulphite & Paper Co.*, 120 USPQ 343 (TT&A Bd. 1959); *In re Armstrong Cork Company*, 180 USPQ 335 (TT&A Bd. 1973); and in *In re Dynamit Nobel AG*, 169 USPQ 499 (TT&A Bd. 1974), respectively. In each of these cases the terms might seem to include certain items classified elsewhere but in fact such items are so specialized in character that they are not generally understood as being included in the broad term.

A filing fee is required for each class, and only goods classified in the designated class may be included. Rule 2.86.

For combining classes in one application, see Rule 2.87 and TMEP section 1113.

804.04(b) *Lack of clarity.*

If a term is so vague or indefinite that what it is intended to identify cannot be understood, and proper examination is hindered, the term must be amended to be sufficiently clear. An example would be the term "metallic parts." An instance is also found in *In re Societe des Parfums Schiaparelli*, 122 USPQ 349 (TT&A Bd. 1959), where clarification of the term "beauty products" was held to be necessary because the term does not have a commonly understood meaning as referring to a known and commercially related group of items. In making inquiry, refer to Rule 2.61(b) and TMEP section 1105.02.

804.04(d) *Inaccuracy.*

If the identification is inconsistent with the goods or services which are indicated by the specimens, or if the ordinary meaning of the language of the identification designates goods or services which would be at variance with what is disclosed by the specimens or any other part of the record, amendment to make the identification accurate will be necessary. For example, "decalcomanias" are not adequately or accurately identified by the term "publications." In *In re Toro Manufacturing Corporation*, 174 USPQ 241 (TT&A Bd. 1972), where the goods were a specialized article known as "grass-catcher bags for lawn-mowers," such use did not justify the broad term "bags" which would encompass goods diverse from and commercially unrelated to applicant's specialized article. See also *Merchanising Promotions* v. *Hastings & Co., Inc.*, 110 USPQ 256 (Comr. Pats. 1956); *Kiekhaefer Corporation* v. *Willys-Overland Motors, Inc. etc.*, 111 USPQ 105 (CCPA 1956), "internal combustion engine" amended to "outboard motor;" *Ex parte Consulting Engineer Publishing Co.*, 115 USPQ 240 (Comr. Pats. 1957), "periodical" amended to "monthly news bulletin;" *Nopco Chemical Company* v. *Kay-Fries Chemicals, Inc.*, 124 USPQ 113 (TT&A Bd. 1960); and *In re Samuel M. Gertman Co., Inc.*, 180 USPQ 336 (TT&A Bd. 1973), "fresh dressed poultry" amended to "frozen ready to eat poultry."

BERNARD A. MEANY,
Assistant Commissioner for Trademarks.

Mar. 15, 1977.

Guidelines for Implementation of Recently Revised Rules

Recently a number of rules relating to Patent Examining and Appeal Procedures were revised. The new rules were published in the Federal Register at 42 F.R. 5588 on January 28, 1977, and in the OFFICIAL GAZETTE at 955 O.G. 1054 on February 22, 1977. The following guidelines are being published to describe the procedures which are being followed in implementing 37 CFR sections 1.11, 1.97–1.99, 1.109, 1.194, 1.291 and 1.292.

Files Open to the Public

Section 1.11(b) is applicable only to those reissue applications filed on or after March 1, 1977. Those reissue applications already on file will not be automatically open to inspection but a liberal policy will be followed by the Office of the Solicitor in granting petitions for access to such applications.

(NOTE.—These sections as changed will be incorporated into the Manual text in Rev. 3 of the Manual.)

For those reissue applications filed on or after March 1, 1977, the following procedure will be observed :

1) The filing of reissue applications will be announced in the OFFICIAL GAZETTE and will include certain identifying data as specified in section 1.11(b). Any member of the general public may request access to a particular reissue application filed after March 1, 1977. Since no record of such request is intended to be kept, an oral request will suffice.
2) The reissue application files will be maintained in the examining groups and inspection thereof will be supervised by group personnel. Although no general limit is placed on the amount of time spent reviewing the files, the Office may impose limitations, if necessary, e.g., where the application is actively being processed.
3) Where the reissue application has left the examining group for administrative processing, requests for access should be directed to the appropriate supervisory personnel in the Division or Branch where the application is currently located.
4) Requests for copies of papers in the reissue application file must be in writing addressed to the Commissioner of Patents and Trademarks, Washington, D.C. 20231 and may be either mailed or delivered to the Office mailroom. The price for copies made by the Office is thirty cents per page.

Prior Art Statements

This notice supersedes the notices of August 12, 1974 (926 O.G. 2) and May 19, 1975 (935 O.G. 902) relating to citations of prior art. Although new sections 1.97 through 1.99 are not effective until July 1, 1977, and are not mandatory upon applicants, they provide an ideal mechanism for complying with the duty of disclosure under 37 CFR 1.56. The statements should be submitted in accordance with the following guidelines :

1) Prior art statements should be submitted at the time of filing the application or within three months thereafter and may be separate from the specification or incorporated therein. The statement shall serve as a representation that the person preparing it has included therein what he believes to be the closest prior art of which he is aware and shall not be construed as a representation that no better art exists or that a search has been made. If the first action in the application is received prior to three months after filing of the application and no prior art statement has been submitted, the prior art statement may be submitted with the response to the first action and be considered timely.
2) The statement shall include a listing of the patents, publications or other information which the preparer of the statement wishes to cite and a concise explanation of the relevance of each listed item. Copies of the pertinent portions of all listed documents shall be supplied along with the statement, both when incorporated into the specification and when filed separately. If two or more patents or publications considered material are substantially identical, a copy of a representative one shall be included with the statement and others may merely be listed with an indication of which are considered to be substantially identical.
3) A translation of the pertinent portions of foreign language patents or publications considered material should be transmitted if an existing translation is readily available to the applicant. It will be sufficient, however, to transmit an equivalent English language patent or publication so long as it is identified as an equivalent.

Where the applicant has submitted copies of prior art in accordance with these guidelines in a prior application, reference to the prior application and the submission therein will be sufficient for the continuing application as far as the copies are concerned. As far as the statement per se is concerned, the relevance of the prior art to the claimed subject matter must be indicated if it differs from its relevance as explained in the prior application.

4) If prior to the issuance of a patent an applicant, pursuant to his duty of disclosure under 37 CFR 1.56, wishes to bring to the attention of the Office additional patents, publications or other information not previously submitted, the additional information should be submitted to the Office with reasonable promptness. It may be included in a supplemental prior art statement or may be incorporated into other communications to be considered by the examiner. Any transmittal of additional information shall be accompanied by explanations of relevance and by copies in accordance with the requirements aforementioned. The transmittal should include a statement explaining why the prior art was not earlier submitted.

While the Patent and Trademark Office will not knowingly ignore any prior art which might anticipate or suggest the claimed invention, no assurance can be given that cited art or other information not submitted in accordance with these guidelines will be considered by the examiner.

After the claims have been indicated as allowable by the examiner, e.g., by the mailing of an Ex parte Quayle action, a notice of allowability (PTOL–327), an examiner's amendment (PTOL–37), or a Notice of Allowance (PTOL–85), any citations submitted will be placed in the file. Since prosecution has ended, however, such submissions will not ordinarily be considered by the examiner unless the citation is accompanied by :

(*a*) A proposed amendment cancelling or further restricting at least one independent claim and narrowing the scope of protection sought ;
(*b*) A timely affidavit under 37 CFR 1.131 with respect to the material cited ; or
(*c*) A statement by the applicant or his attorney or agent that, in the judgment of the person making the statement, the prior art or other information cited raises a serious question as to the patentability of the claimed subject matter, or is closer prior art than that of record.

If the material is submitted after the base issue fee has has been paid, it must also be accompanied by a petition under 37 CFR 1.183 requesting a waiver of 37 CFR 1.312. Such petition, if granted, would result in review of the art by the examiner and possible entry of the amendment.

In each instance where an examiner considers, but does not cite on form PTO–892, specific prior art referred to in a paper placed in the application file, the examiner will place a notation adjacent to the reference according to the following :

If included in the specification, the examiner will write his or her initials adjacent to any references checked and enter "checked" in the left margin opposite the initials. If presented in a separate paper or in the remarks of an amendment, the examiner's initials and "checked" will be entered adjacent to the citations or wherever possible to indicate clearly those checked.

Reasons for Allowance

One of the primary purposes of the change in Section 1.109 is to improve the quality and reliability of issued patents by providing a complete file history which should clearly reflect, as much as is reasonably possible, the reasons why the application was allowed. Such information facilitates evaluation of the scope and strength of a patent by the patentee and the public and may help avoid or simplify litigation of a patent.

The practice of stating the reasons for allowance is not new and the rule merely formalizes the examiner's existing authority to do so and provides applicants an opportunity to comment upon any such statement of the examiner.

When the examiner determines that it is necessary or desirable, a "Statement of Reasons for Allowance" will be prepared. The "Statement" will usually be an attachment to either a notice of allowability (PTOL–327) or Examiner's Amendment (PTOL–37). Any comments considered necessary by applicant must be submitted no later than the issue fee and should preferably *accompany* the issue fee. Submission with the issue fee avoids any delay in the processing of the application and avoids the necessity to associate the comments with the application while it is in issue except at

the time the file must be pulled to record the payment of the issue fee. Such comments will be entered in the application file by the Allowed Files Branch with an appropriate notation on the "contents" list of the file wrapper, but will not be reviewed by the examiner.

Oral Hearings Before Board of Appeals

Section 1.194 clarifies the circumstances in which oral hearings should be requested and provides for oral arguments by, or on behalf of, primary examiners in certain appeals.

Under Section 1.194, the following procedures will be in effect:

1) In accordance with Section 1.192, appellants who desire an oral hearing must request the same at the time of filing the appeal brief.
2) If appellant has requested an oral hearing and the primary examiner intends to present an oral argument, the last paragraph of the examiner's answer will indicate this intention.
3) Notice of the oral hearing will be given to the appellant and, at the same time, to the primary examiner in those cases in which the primary examiner has indicated an intention to present an oral argument.
4) After an oral hearing has been confirmed and the date set as provided in Section 1.194(c), the application file will be delivered to the examiner via the appropriate Group Director at least one week prior to the date of the hearing for those cases in which the examiner is expected to be present at the hearing. In those cases where the Board requests the presentation of an oral argument by, or on behalf of, the primary examiner, the appellant will be so notified. The Board's request for an oral argument may, where appropriate, indicate specific points or questions to which the argument should be particularly directed. The application file wil be returned to the Board before the hearing.
5) In those appeals in which an oral hearing has been confirmed and either the primary examiner or the Board has indicated a desire for oral argument, such oral argument may be presented whether or not appellant appears.

Protests and Public Use Proceedings

Amended sections 1.291 and 1.292 give greater recognition to the value of written protests and public use petitions and are intended as an aid in avoiding the issuance of invalid patents.

Under sections 1.291(b) and (c) and 1.292(b), the following procedures will be observed:

1) Only in those instances where it has not been possible to serve protest papers upon the applicant, attorney or agent should duplicates of the papers submitted be provided. In this case the appropriate examining group will attempt to get the duplicate copy to the applicant, attorney or agent. However, every effort should be made by the protester to effect service.
2) Citations of prior art and any papers related thereto may be entered in the file after a patent has been granted by submitting them to the attention of the Record Room, where they will be entered without comment by the Office. If after diligent effort it has not been possible to serve the prior art citations and related papers on the patentee, his attorney or agent, duplicate copies should be submitted in which case the Record Room will attempt to get the duplicate copy to the owner of record.
3) When public use petitions and accompanying papers are submitted they, or a notice in lieu thereof, will be entered in the application file. Duplicate copies should be submitted only when, after diligent effort, it has not been possible for petitioner to serve a copy of the petition on the applicant, his attorney or agent in which case the Office of the Solicitor will attempt to get the duplicate copy to the applicant, his attorney or agent.
4) To ensure consideration by the examiner, protests should be timely submitted, i.e., before final rejection or allowance. Consideration of protests filed after final rejection or allowance will depend upon the relevance of the prior art documents and the point in time at which they are submitted. Documents which clearly anticipate or render obvious one or more claims will not knowingly be ignored. If protests are not timely submitted or if they fail to comply with section 1.291(a) as to the submission of a copy of each prior art document relied upon, they will be acknowledged and referred to the examiner having charge of the subject matter involved for entry in the application file and such consideration as seems warranted.

In each instance where an examiner considers but does not cite on form PTO–892 specific prior art referred to in a protest, the examiner will place a notation in the protest paper adjacent to the reference which will include his or her initials and the term "checked."

Additional future guidelines as to protest procedures may be developed after gaining experience with the new practice.

C. MARSHALL DANN,
Mar. 18, 1977. *Commissioner of Patents and Trademarks.*

Patent Suits

Notices under 35 U.S.C. 290; Patent Act of 1952

3,187,234, Muranaka, Yamamoto, Hamberg and Ikegami, SELECTIVE SIGNAL-RESPONSIVE CIRCUIT; **3,747,228,** Y. Yamamoto, INTERVIEW MACHINE, **filed** Oct. 28, 1976, D.C., C.D. Calif. (Los Angeles), Doc. CV76–3354, *Yujiro Yamamoto, etc.* v. *Dictaphone Corporation et al.*

3,236,709, R. J. Carver, TIRE RECAPPING PROCESS, **filed** Nov. 22, 1976, D.C., W.D.N.Y. (Buffalo), Doc. 76–541, *Bandag, Incorporated* v. *Lewis General Tires, Incorporated.*

3,329,512, Shipley, Jr. and Gulla, CHEMICAL DEPOSITION OF COPPER AND SOLUTIONS THEREFOR, **filed** Oct. 22, 1976, D.C. Conn. (Hartford), Doc. H76–413, *Shipley Co. Inc.* v. *MacDermid, Inc.*

3,371,455, G. C. Fox, SWIMMING POOL STRUCTURE, **filed** July 22, 1976, D.C.N.J. (Trenton), Doc. 76–1420, *Fox Pool Corp.* v. *Paul Lewis, doing business as American Pools.*

3,398,689, R. W. Allington, APPARATUS PROVIDING A CONSTANT-RATE TWO COMPONENT FLOW STREAM, **filed** Nov. 23, 1976, D.C., N.D. Ill. (Chicago), Doc. 76–4340, *Instrumentation Specialties Co.* v. *Waters Associates, Inc. et al.*

3,557,469, D.C. Edgington, GRAPHIC ARTS FILM DRYER; **3,800,434,** Edgington and Edgington, GRAPHIC ARTS FILM DRYER, **filed** Oct. 8, 1975, D.C., N.D. Ill. (Chicago), Doc. 75c3386, *Donald C. Edgington et al.* v. *Buckingham Graphics, Inc. et al.* Pursuant to stipulation all matters settled. Cause dismissed with prejudice, July 19, 1976.

3,659,284, W. T. Rusch, TELEVISION GAMING APPARATUS; **3,659,285,** Baer, Rusch, Harrison, TELEVISION GAMING APPARATUS AND METHOD, **filed** Sept. 22, 1975, D.C., N.D. Ill. (Chicago), Doc. 75c3153, *The Magnavox Co. et al.* v. *Sears, Roebuck & Co.* Enter order dismissing cause without prejudice and without costs, June 10, 1976. **Same, filed** Nov. 18, 1975, D.C., N.D. Ill. (Chicago), Doc.75c3933, *Atari, Inc.* v. *The Magnavox Company et al.* Enter on consent in favor of defendants and against plaintiff, June 9, 1976.

3,659,285. (See 3,659,284.)

3,747,228. (See 3,187,234.)

3,762,648, Deines, Trenary, Smith and Hickman, SPRAY NOZZLE; **3,801,019,** Trenary and Smith, same; **3,958,756,** Trenary, Smith, Ruehmann, Elkins, Erwin and Treadwell, SPRAY NOZZLES, **filed** Nov. 1, 1976, D.C., S.D. Fla. (Miami), Doc. 76–1931–C–JLK, *Teledyne Industries, Inc.* v. *Windmere Products, Inc. et al.*

3,800,434. (See 3,557,469.)

3,801,019. (See 3,762,648.)

3,845,349, T. Liebman, LINE SYNCHRONIZED STROBE LIGHT, **filed** Feb. 25, 1975, D.C., C.D. Calif. (Los Angeles), Doc. CV75–625 AAH, *Theodore Liebman et al.* v. *American Lighting Specialties.* Filed consent decree and judgment and order thereon that plaintiff is owner of said patent, that defendant has infringed on said patent and said defendant is enjoined from further use, sale of said patent and that judg-

ment is entered in favor of plaintiff and against defendant, Jan. 9, 1976.

3,868,434, Westphal and Heining, POLYMER COMPOSITION AND PROCESS, **filed** Jan. 21, 1976, D.C. Del. (Wilmington), Doc. 76–37, *Cosden Oil & Chemical Company* v. *Foster Grant Co., Inc.*

3,870,953, Boatman and Hall, IN CIRCUIT ELECTRONIC COMPONENT TESTER, **filed** Dec. 1, 1976, D.C., N.D. Calif. (San Francisco), Doc. C–76–2691–WWS, *Zehntel, Inc.* v. *Testline Instruments, Inc.*

3,918,646, Diaz and Rangel-Garza, IRRIGATION SYSTEMS BY TRICKLING, **filed** Nov. 12, 1976, D.C., C.D. Calif. (Los Angeles), Doc. CV76–3541–RMT, *Jaime Leal-Diaz et al.* v. *AG-Drip Sales, Inc. et al.*

3,932,690, G. E. Gliemeroth, TRANSPARENT, PHOTOTROPIC LAMINATE, **filed** Mar. 15, 1976, D.C.N.J. (Newark), Doc. 76–474, *Raceway Components, Inc.* v. *H. H. Robertson Company.*

3,932,696, Fork, Lindner, Kelley and Albrecht, UNDER FLOOR ACCESS HOUSING UTILIZING A TROUGH SPACE OF A CELLULAR FLOORING UNIT, **filed** May 6, 1976, D.C.N.J. (Newark), Doc. 76–840, *Raceway Components, Inc. et al.* v. *H. H. Robertson Company.*

3,958,756. (See 3,762,648.)

3,967,752, D. F. Cudzik, EASY-OPEN WALL; **3,967,753**, same, **filed** Nov. 12, 1976, D.C., N.D. Ill. (Chicago), Doc. 76c4198, *Reynolds Metals Company* v. *The Continental Group, Inc.*

3,967,753. (See 3,967,752.)

Re. 25,360, E. G. Rice, COMBINATION STOCKINGS AND PANTY, **filed** June 25, 1975, D.C.N.C. (Charlotte), Doc. C–C–75–206, *Tights, Inc.* v. *Admiration Hosiery Mill, Inc.* Stipulation of dismissal, Nov. 23, 1976.

Erratum

Under Patent Suits in the OFFICIAL GAZETTE of December 21, 1976, volume 953, page 881, the paragraph beginning with 3,708,967 and the paragraph beginning with 3,826,068 should be deleted. Also 3,859,776 (See 3,708,967) should be deleted.

PATENT NOTICES

Certificates of Correction for the Week of Apr. 12, 1977

P.P. 3,971	3,926,742	3,966,979	3,983,149	3,992,895	3,996,986	4,001,890	4,005,386
Re. 28,840	3,928,890	3,967,937	3,983,246	3,992,909	3,997,132	4,002,163	4,005,390
Re. 29,051	3,929,566	3,968,765	3,983,300	3,993,427	3,997,495	4,002,270	4,005,591
Re. 29,126	3,940,014	3,969,550	3,984,342	3,993,678	3,997,579	4,002,343	4,005,604
D. 241,698	3,940,706	3,970,419	3,984,665	3,993,683	3,997,604	4,002,519	4,005,801
D. 243,073	3,941,869	3,970,544	3,984,980	3,993,835	3,997,610	4,002,886	4,005,827
3,560,184	3,944,675	3,972,789	3,985,035	3,993,898	3,997,792	4,003,131	4,006,044
3,712,542	3,947,474	3,972,874	3,985,651	3,993,903	3,997,932	4,003,343	4,006,143
3,788,321	3,948,466	3,973,807	3,985,800	3,993,914	3,998,223	4,003,376	4,006,285
3,793,053	3,949,088	3,974,995	3,987,565	3,994,442	3,998,275	4,003,815	4,006,346
3,848,532	3,952,421	3,975,120	3,987,835	3,994,572	3,998,354	4,003,892	4,006,355
3,855,267	3,952,874	3,975,287	3,988,553	3,994,814	3,999,448	4,003,973	4,006,428
3,856,921	3,954,827	3,975,952	3,989,070	3,994,833	3,999,810	4,004,016	4,006,471
3,867,531	3,956,461	3,976,748	3,989,323	3,995,657	3,999,850	4,004,174	4,006,504
3,880,935	3,956,627	3,977,842	3,990,048	3,995,836	3,999,969	4,004,236	4,006,506
3,885,699	3,957,173	3,977,989	3,990,315	3,996,049	4,000,276	4,004,434	4,006,529
3,886,973	3,958,898	3,978,319	3,991,111	3,996,054	4,000,493	4,004,673	4,006,618
3,887,439	3,958,962	3,979,425	3,991,426	3,996,115	4,000,593	4,004,759	4,006,842
3,888,043	3,959,268	3,979,528	3,991,444	3,996,172	4,000,633	4,004,830	4,006,936
3,903,162	3,959,369	3,980,153	3,991,576	3,996,253	4,000,665	4,004,903	4,007,338
3,906,054	3,959,500	3,980,406	3,991,637	3,996,272	4,000,667	4,005,024	4,007,557
3,907,108	3,960,837	3,980,440	3,991,749	3,996,295	4,000,668	4,005,244	4,007,801
3,910,950	3,961,868	3,982,009	3,992,511	3,996,341	4,000,854	4,005,263	4,008,341
3,919,902	3,963,170	3,983,067	3,992,593	3,996,778	4,000,944	4,005,295	
3,922,886	3,966,028	3,983,102	3,992,642	3,996,942	4,001,775	4,005,319	

Disclaimers

3,938,012.—*Vincent J. Patti*, Norridge, Ill. VARIABLE CAPACITOR. Patent dated Feb. 10, 1976. Disclaimer filed Feb. 14, 1977, by the assignee, *Standex International Corporation*.

Hereby enters this disclaimer to claims 10 and 11 of said patent.

3,987,168.—*Hellmut Hoeffmann*, Wuppertal, *Ingeborg Hammann*, Cologne, *Bernhard Homeyer*, Opladen, and *Wilhelm Stendel*, Wuppertal, Germany. O-ALKYL-O-[1-CYANO-ALKYL - 5 - SUBSTITUTED-MERCAPTO-TRIAZOL(3) YL] - (THIONO) - PHOSPHORIC(PHOSPHONIC) ACID ESTERS OR ESTER-AMIDES. Patent dated Oct. 19, 1976. Disclaimer filed Feb. 14, 1977, by the assignee, *Bayer Aktiengesellschaft*.

Hereby enters this disclaimer to claims 1, 2, 4 and 6 to 10 of said patent.

Disclaimer and Dedication

3,365,646.—*Franklin C. Brewster*, Franklin Park, Ill. ELECTRONIC APPARATUS. Patent dated Jan. 23, 1968. Disclaimer and dedication filed Jan. 3, 1977, by the assignee, *Motorola, Inc.*

Hereby disclaims and dedicates to the Public claim 1 of said patent.

PATENT EXAMINING CORPS

RENE D. TEGTMEYER, Assistant Commissioner

WILLIAM FELDMAN, Deputy Assistant Commissioner

CONDITION OF PATENT APPLICATIONS AS OF FEBRUARY 26, 1977

PATENT EXAMINING GROUPS	Actual Filing Date of Oldest New Case Awaiting Action
CHEMICAL EXAMINING GROUPS	
GENERAL CHEMISTRY AND PETROLEUM CHEMISTRY, GROUP 110—S. N. ZAHARNA, Director. Inorganic Compounds; Inorganic Compositions; Organo-Metal and Organo-Metalloid Chemistry; Metallurgy; Metal Stock; Electro Chemistry; Batteries; Hydrocarbons; Mineral Oil Technology; Lubricating Compositions; Gaseous Compositions; Fuel and Igniting Devices.	7-2-76
GENERAL ORGANIC CHEMISTRY, GROUP 120—A. L. LEAVITT, Director. Heterocyclic, Amides; Alkaloids; Azo; Sulfur; Misc. Esters; Carbohydrates; Herbicides; Poisons; Medicines; Cosmetics; Steroids; Oxo and Oxy; Quinones; Acids; Carboxylic Acid Esters; Acid Anhydrides; Acid Halides.	6-22-76
HIGH POLYMER CHEMISTRY, PLASTICS AND MOLDING, GROUP 140—A. P. KENT, Director. Synthetic Resins; Rubber; Proteins; Macromolecular Carbohydrates; Mixed Synthetic Resin Compositions; Synthetic Resins With Natural Polymers and Resins; Natural Resins; Reclaiming; Pore-Forming; Compositions (Part) e.g.: Coating; Molding; Ink; Adhesive and Abrading Compositions; Molding, Shaping, and Treating Processes.	3-18-76
COATING AND LAMINATING, BLEACHING, DYEING AND PHOTOGRAPHY, GROUP 160—R. FRIEDMAN, Director. Coating; Processes and Misc. Products; Laminating Methods and Apparatus; Stock Materials; Adhesive Bonding; Special Chemical Manufactures; Special Utility Compositions; Bleaching; Dyeing and Photography.	4-22-76
SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP 170—H. S. VINCENT, Director. Fertilizers; Foods; Fermentation; Analytical Chemistry; Reactors; Sugar and Starch; Paper Making; Glass Manufacture; Gas; Heating and Illuminating; Cleaning Processes; Liquid Purification; Distillation; Preserving; Liquid, Gas, and Solid Separation; Gas and Liquid Contact Apparatus; Refrigeration; Concentrative Evaporators; Mineral Oils Apparatus; Misc. Physical Processes.	3-1-76
ELECTRICAL EXAMINING GROUPS	
INDUSTRIAL ELECTRONICS, PHYSICS AND RELATED ELEMENTS, GROUP 210—W. L. CARLSON, Director. Generation and Utilization; General Applications; Conversion and Distribution; Heating and Related Art Conductors; Switches; Photography; Motion Pictures; Illumination; Horology; Acoustics; Recorders; Weighing Scales.	10-15-75
SPECIAL LAWS ADMINISTRATION, GROUP 220—C. D. QUARFORTH, Director. Ordnance, Firearms and Ammunition; Radar, Underwater Signalling, Directional Radio, Torpedoes, Seismic Exploring, Radio-Active Batteries; Nuclear Reactors, Powder Metallurgy, Rocket Fuels; Radio-Active Material.	1-12-76
INFORMATION TRANSMISSION, STORAGE AND RETRIEVAL, GROUP 230—J. F. COUCH, Director. Communications; Multiplexing Techniques; Facsimile; Data Processing, Computation and Conversion; Storage Devices and Related Arts.	1-9-76
RECEPTACLES, SANITATION AND CLEANING, WINDING, AND MEASURING, GROUP 240—N. ANSHER, Director. Receptacles; Joint Packing; Conduits; Plumbing Fixtures; Textile Spinning; Food; Agitating; Cleaning; Pressing; Geometrical Instruments; Sound Recording; Winding and Reeling; Measuring and Testing; Indicating.	9-7-76
ELECTRONIC COMPONENT SYSTEMS AND DEVICES, GROUP 250—L. FORMAN, Director. Semi-Conductor and Space Discharge Systems and Devices; Electronic Component Circuits; Wave Transmission Lines and Networks; Optics; Radiant Energy; Measuring.	4-2-76
DESIGNS, GROUP 290—C. D. QUARFORTH, Director. Industrial Arts; Household, Personal and Fine Arts.	9-10-75
MECHANICAL EXAMINING GROUPS	
HANDLING AND TRANSPORTING MEDIA, GROUP 310—D. J. STOCKING, Director. Conveyors; Hoists; Elevators; Article Handling Implements; Store Service; Sheet and Web Feeding; Dispensing; Fluid Sprinkling; Fire Extinguishers; Coin Handling; Check Controlled Apparatus; Classifying and Assorting Solids; Boats; Ships; Aeronautics; Motor and Land Vehicles and Appurtenances; Brakes; Railways and Railway Equipment.	3-26-76
MATERIAL SHAPING, ARTICLE MANUFACTURING, TOOLS, GROUP 320—S. S. MATTHEWS, Director. Manufacturing Processes, Assembling, Combined Machines, Special Article Making; Metal Deforming; Sheet Metal and Wire Working; Metal Fusion—Bonding, Metal Founding; Metallurgical Apparatus: Plastics Working Apparatus; Plastic Block and Earthenware Apparatus: Machine Tools for Shaping or Dividing; Work and Tool Holders, Woodworking; Tools; Cutlery; Jacks.	8-2-76
AMUSEMENT, HUSBANDRY, PERSONAL TREATMENT, INFORMATION, GROUP 330—G. M. FORLENZA, Director. Amusement and Exercising Devices; Projectors; Animal and Plant Husbandry; Butchering; Earth-Working and Excavating; Fishing, etc.; Tobacco; Artificial Body Members; Dentistry; Jewelry; Surgery; Toiletry; Printing; Typewriters; Stationery; Information Dissemination.	5-3-76
HEAT, POWER, AND FLUID ENGINEERING, GROUP 340—B. R. GAY, Director. Power Plants; Combustion Engines; Fluid Motors; Reaction Motors; Pumps; Rotary Engines and Pumps; Heat Generation and Exchange; Refrigeration; Ventilation; Drying; Temperature and Humidity Regulation; Machine Elements; Couplings; Gearing; Bearings; Clutches; Power Transmission; Fluid Handling and Control; Lubrication.	4-2-76
GENERAL CONSTRUCTIONS, TEXTILES AND MINING, GROUP 350—M. M. NEWMAN, Director. Joints; Fasteners; Rod, Pipe and Electrical Connectors; Miscellaneous Hardware; Locks; Building Structures; Closure Operators; Bridges; Closures; Earth Engineering; Drilling; Mining; Furniture; Supports; Cabinet Structures; Centrifugal Separations; Coating; Textiles; Apparel and Shoes; Sewing Machines.	7-22-76

Expiration of patents: The patents within the range of numbers indicated below expire during March 1977, except those which may have expired earlier due to shortened terms under the provisions of Public Law 690, 79th Congress, approved August 8, 1946 (60 Stat. 940) and Public Law 619, 83rd Congress, approved August 23, 1954 (68 Stat. 764), or which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents..... Numbers 2,926,352 to 2,931,037, inclusive
Plant Patents..... Numbers 1,919 to 1,925, inclusive

REISSUES

APRIL 12, 1977

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

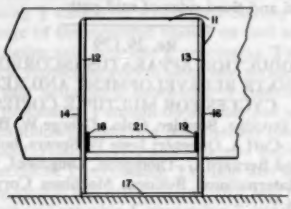
Re. 29,175
COMPACT LIFT FOR VAN

Kenneth A. Tauer, 9801 Robin Oak Rd., Minnetonka, Minn. 55343

Original No. 3,826,386, dated July 30, 1974, Ser. No. 346,349, Mar. 30, 1973. Continuation-in-part of Ser. No. 322,732, Jan. 11, 1973, abandoned. Application for reissue June 21, 1976, Ser. No. 698,296

Int. Cl.² B60G *1/48*

U.S. Cl. 214—77 R **5 Claims**



1. In an automobile having a van-type body, including body door openings provided with doors, a lift installed therein comprising:

a pair of linkage mechanisms secured to said body at one said door opening, each one of said pair of linkage mechanisms including:

a suspension arm hingingly secured to said body at one end and depending therefrom in a substantially vertical direction;

similar upper and lower pivot arms, each pivoted at one end to the lower end of said suspension arm at points spaced by a selected distance;

a vertical support connected by pivots at two points to the other ends of said pivot arms, said two points being spaced by said selected distance, whereby said upper and lower pivot arms, and a portion of said suspension arm and of said vertical support constitute a pantograph;

a guide arm pivoted at one end in one of said pivot arms and at the other end in the van structure; said lift also comprising:

a platform pivoted to and carried by said linkage mechanism;

means for powering said lift;

a cable connected to said platform and to said means for powering; and

a minor linkage connected to one of said pivot arms and to said cable whereby said platform can be raised and lowered and moved between horizontal and vertical positions.

Re. 29,176
PRODUCT PRESSURIZED COMPRESSED AIR DISPENSER

Herbert H. Loeffler, Arlington, Mass., assignor to Arthur D. Little, Inc., Cambridge, Mass.

Original No. 3,910,465, dated Oct. 7, 1975, Ser. No. 520,946, Nov. 4, 1974. Application for reissue Feb. 17, 1976, Ser. No. 658,669

Int. Cl.² B67D *5/54*

U.S. Cl. 222—389 **15 Claims**

1. A dispenser for dispensing a fine spray by means of compressed air, comprising:

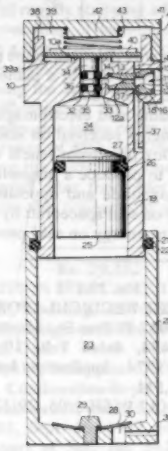
a body having a dispensing nozzle means therein for mixing and dispensing a fluent product and compressed air,

a piston-cylinder means depending from said body and having a fixed member in said body and a movable member movable relative to said fixed member for compressing air therebetween, said fixed member having a fluent product containing recess therein opening toward said movable member,

a product pressurizing piston in said product containing recess having an end exposed toward said movable member,

said body having a product flow path therethrough from said product containing recess to said nozzle means and a product control valve means in said product flow path for controlling flow of product therethrough,

said body further having a compressed air flow path therethrough to said nozzle means and compressed air valve



means in said compressed air flow path which is opened near the end of the movement of said movable means for releasing compressed air at a predetermined pressure into said compressed air flow path, and

a product valve actuator coupled to said product valve, said compressed air flow path opening to said product valve actuator and said product valve actuator being movable in response to the pressure of the compressed air for opening said product valve,

whereby when the movable member is moved toward the fixed member for compressing air the compressed air acts on said product pressurizing piston for pressurizing the product, and compressed air at a predetermined pressure is released to said flow path, said valve actuator is moved to open said product valve.

Re. 29,177
SOLAR TORQUE COMPENSATION FOR A SATELLITE

Theodore Donald Michaelis, Medford, N.J., assignor to RCA Corporation, New York, N.Y.

Original No. 3,838,344, dated Oct. 1, 1974, Ser. No. 319,366, Dec. 29, 1972. Application for reissue June 23, 1975, Ser. No. 589,520

Claims priority, application United Kingdom, Mar. 20, 1972, 12935/72

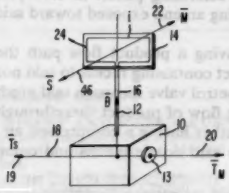
Int. Cl.² B64G *1/00*

U.S. Cl. 244—166 **3 Claims**

1. An attitude control system for a [spin] stabilized spacecraft to compensate for torques due to solar pressure,

said spacecraft having a panel with a set of solar cells adapted to receive solar radiant energy for conversion to electrical power, said panel being arranged for deployment from the spacecraft including means for orienting the panel toward the sun, the improvement comprising:

a. electromagnetic means included in said panel for generating a magnetic flux having a magnetic field extending normal to the plane of said panel for reacting with the magnetic field of the earth, said electromagnetic means comprising a single electromagnetic air core coil having



at least one turn of wire disposed in the peripheral portion of said solar cell panel, and in a plane parallel with the plane of said solar panel, and

b. means for energizing said electromagnetic means in response to solar energy received on said solar panel such that a magnetic flux therefrom reacts with the magnetic field of the earth to produce a magnetic torque substantially of equal magnitude and opposite direction to the torque developed on said spacecraft by the solar pressure of the solar radiant energy on said panel.

Re. 29,178

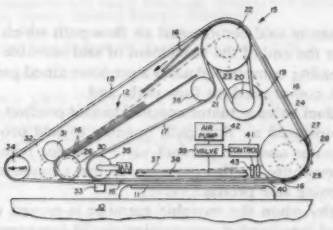
SHEET RECIRCULATOR

Richard H. Colwill, 1007 Hellam St., Monterey, Calif. 93940

Original No. 3,937,454, dated Feb. 10, 1976, Ser. No. 578,084, May 16, 1974. Application for reissue May 14, 1976, Ser. No. 686,511

Int. Cl.² B65H *3/06, 29/12*

U.S. Cl. 271—6 **11 Claims**



1. In apparatus for feeding document sheets in order from a supply stack to the viewing region of a copier and back to said supply stack, the improvement comprising:

a. means arranged above said viewing region for forming a circulation path for said sheets, said path being generally triangular in vertical cross section;

b. means for supporting said supply stack at an incline along a first side of said path;

c. a second side of said path being arranged to extend from the lower region of said first said of said path across said viewing region;

d. a third side of said path being arranged to extend from said second side of said path upward to the upper region of said supply stack;

e. means for successively removing the bottom sheet of said supply stack from said lower region of said supply stack;

f. means for advancing said removed sheets successively in order into said second side of said path;

g. means for synchronizing said advance of said removed sheets with operations of said copier for copying said sheets in said viewing region;

h. means for advancing said copied sheets successively in order from said second side of said path through said third side of said path;

i. means for advancing said copied sheets successively in order to superposed relation over the top sheet of said supply stack; and

j. said means for advancing said removed sheets and said copied sheets comprises a pair of endless belts, drive means for said endless belts, [and] *an* outer one of said belts is substantially transparent, [an inner one of said belts is substantially opaque,] said inner belt passes under said supply stack, said outer belt passes over said supply stack, and said belts travel together through said second and third sides of said path.

Re. 29,179

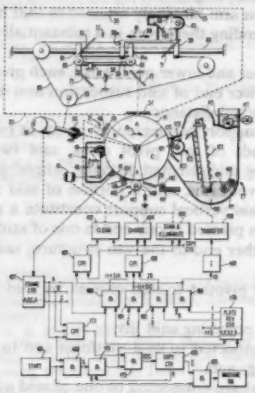
REPRODUCTION APPARATUS INCORPORATING ALTERNATE REDEVELOPMENT AND REIMAGING CYCLES FOR MULTIPLE COPIES

Ronald V. Davidge, Boulder, Colo.; George W. Hobgood, Austin, Tex.; Carl A. Queener; Jesse W. Spears, both of Boulder, Colo., and Bernard G. Thompson, Longmont, Colo., assignors to International Business Machines Corporation, Armonk, N.Y.

Original No. 3,736,055, dated May 29, 1973, Ser. No. 209,326, Dec. 17, 1971. Application for reissue May 22, 1975, Ser. No. 580,009

Int. Cl.² G03G *15/00*

U.S. Cl. 355—14 **13 Claims**



1. An electrostatic transfer reproduction apparatus incorporating an electrophotographic plate having at least one image area thereon which travels in a first direction in a closed loop past a plurality of processing stations comprising:

mounting means for mounting a master for optical projection;

an imaging [processing] station for projecting a light image of said mounted master onto said image area of said plate as said image area travels therepast creating a latent image on said image area, said imaging [processing] station including;

an actuable moving optical projecting system for projecting said light image while moving in said first direction from a home position;

actuable drive means for moving said optical projection system in said first direction from said home position and for returning said optical projection system to said home position;

a developer [processing] station for applying electrostatically charged developer material onto said image area thereby developing said latent image whenever said image area travels therepast;

a transfer [processing] station for transferring each developed image from said image area onto a substrate when said image area travels therepast;

an actuable [processing] station actuable for removing a latent image on said image area as said image area travels therepast;

position sensing means for sensing the position of said at least one image area with respect to said processing stations;

cycle control means responsive to said sensing means for actuating said optical projection system and said drive means when said image area travels past said imaging [processing] station on a first pass thereby creating a latent image of the mounted master on said image area, for deactuating said actuable [processing] station and said optical projection system when said image area travels past said actuable [processing] station and said image [processing] station on at least one next subsequent pass following said first pass thereby retaining said latent image created during said first pass and for actuating said actuable [processing] station and said optical projecting system and drive means when said image area travels past said actuable [processing] station and said imaging [processing] station following said at least one next subsequent pass thereby creating a further latent image of said mounted master on said image area, the latent image on said at least one image area being developed at said developer [processing] station and transferred at said transfer [processing] station at least two times before removal thereof at said actuable [processing] station.

Re. 29,180

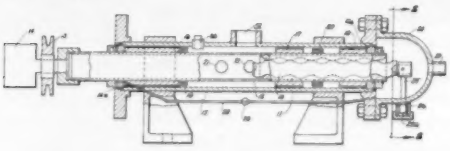
MOINEAU PUMP WITH ROTATING OUTER MEMBER

Wallace Clark, 1830 S. German Church Road, Indianapolis, Ind. 46239

Original No. 3,932,072, dated Jan. 13, 1976, Ser. No. 504,354, Sept. 9, 1974. Continuation-in-part of Ser. No. 411,162, Oct. 30, 1973, abandoned. Application for reissue Apr. 2, 1976, Ser. No. 673,272

Int. Cl.² F01C *1/10*; F04C *1/06*; F16C *25/00, 3/14*

U.S. Cl. 418—48 6 Claims



1. A pump constituted of a gear pair made up of an inner member having at least one external helical thread, and an outer member having internal helical threads, there being one more internal helical thread in the outer member than the number of external helical threads on the inner member, a radial arm non-rotatably secured at one of its ends to said inner member, and fixed means limiting the other end of said radial arm to reciprocatory and oscillatory motion, said outer member being free to rotate on its true axis, said outer member being fixed in a tubular casing extending beyond said inner and outer members and constituting a drive shaft, said casing having at least one aperture for the passage of fluid being pumped, and being disposed within a housing, said casing being supported for rotation within said housing in bearings, said housing having a port at each end of said gear pair, whereby the direction of pumping may be reversed by reversing the direction of rotation of said drive shaft.

Re. 29,181

METHOD OF PREPARING PRINTED CIRCUIT BOARDS WITH TERMINAL TABS

Charles H. Dixon, III, Waukesha, Wis., assignor to RBP Chemical Corporation, Milwaukee, Wis.

Original No. 3,926,699, dated Dec. 16, 1975, Ser. No. 534,034, Dec. 18, 1974. Continuation-in-part of Ser. No. 479,705, June 17, 1974, abandoned, which is a division of Ser. No. 322,040, Jan. 8, 1973, Pat. No. 3,841,905, which is a continuation-in-part of Ser. No. 90,908, Nov. 19, 1970, abandoned. Application for reissue June 4, 1976, Ser. No. 693,053

Int. Cl.² C23F *1/02*

U.S. Cl. 156—656 7 Claims

1. The method of rapidly stripping a layer of metal selected from the group consisting of lead-tin solder and tin from a layer of copper on a fiberglass circuit board without adversely affecting the copper and fiberglass, said process comprising the steps of exposing the solder to a composition comprising the ammonium bifluoride in the range of 10% to 25% by weight, hydrogen peroxide in the range of 1% to 5% by weight, and water in the range of 89% to 70% by weight for a time sufficient to remove the solder, and rinsing the said composition from the copper after the solder has been effectively stripped and before the copper and plastic have been adversely affected.

Re. 29,182

ORAL COMPOSITION FOR CALCULUS RETARDATION

Homer W. McCune, Wyoming, and Nathaniel B. Tucker, Glendale, both of Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio

Original No. 3,488,419, dated Jan. 6, 1970, Ser. No. 731,312, May 22, 1968. Continuation-in-part of Ser. No. 693,713, Dec. 27, 1967, abandoned, which is a continuation-in-part of Ser. No. 668,702, Sept. 18, 1967, abandoned, which is a continuation-in-part of Ser. No. 512,548, Dec. 8, 1965, abandoned. Application for reissue June 14, 1976, Ser. No. 696,019

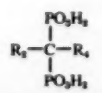
Int. Cl.² A61K *7/16*

U.S. Cl. 424—49 21 Claims

1. [An oral] *A dentifrice* composition effective in inhibiting the formation of dental calculus without adversely affecting tooth structure, comprising (1) from about .01% to about 10% by weight of a polyphosphonate selected from the group consisting of those of the formulae:

(I)

or



(II)

wherein R_1 and R_2 are each hydrogen or CH_2OH; n is an integer of from 3 to 10; R_3 is hydrogen, alkyl containing from 1 to about 20 carbon atoms, alkenyl containing from 2 to about 20 carbon atoms, phenyl, naphthyl, phenylethyl, benzyl, halogen, amino, dimethylamino, diethylamino, N-hydroxy-N-ethylamino, acetylamino, $-CH_2COOH$ $-CH_2PO_3H_2$, $-CH(PO_3H_2)(OH)$ or $-CH_2CH(PO_3H_2)_2$ R_4 is hydrogen, lower alkyl, amino, benzyl, halogen, hydroxyl $-CH_2COOH$, $CH_2PO_3H_2$, or $-CH_2CH_2PO_3H_2$; or

a pharmaceutically acceptable salt thereof, and (2) [a carrier suitable for use in the oral cavity,] *from about 0.5% to 95% by weight of an abrasive material*, the pH of the compositon being within the range from about 5.0 to 11.0, *said composition being free of calcium abrasives which would yield enough soluble calcium to significantly impair the anticalculus activity of said polyphosphonate.*

Re. 29,183

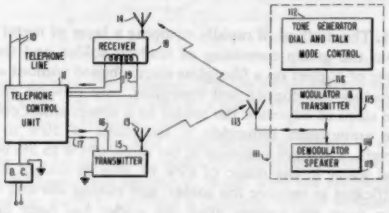
TELEPHONE RANGE EXPANDER

Gene Greneker, III, 2546 Wilson Woods Drive, Decatur, Ga. 30033

Original No. 3,721,771, dated Mar. 20, 1973, Ser. No. 884,505, Dec. 12, 1969. Application for reissue Aug. 19, 1974, Ser. No. 498,638

Int. Cl.[2] H04M *3/06*

U.S. Cl. 179—41 A **16 Claims**



11. Extension telephone apparatus for remotely using a telephone line at a subscriber's station comprising:

a mobile unit including:

mobile transmitter means,

mobile receiver means;

tone means for alternatively generating a first tone and a second tone; and

selector means for selectively connecting said tone means to said mobile transmitter means to cause said tones generated by said tone means to be transmitted through said mobile transmitter means; and,

a control unit at the subscriber's station including:

control transmitter means for transmitting to said mobile receiver means signals on said telephone line;

control receiver means for receiving said first and second tones transmitted by said mobile transmitter means;

filter switch means connected to said control receiver means and operable in response to receipt of said first tone;

stepping switch means responsive to operation of said filter switch means having normal, first and second operated positions;

ringing circuit means operatively associated with said normal position of said stepping switch means and said control transmitter means for generating ringing signals in response to ringing signals on the telephone line and causing said control transmitter means to transmit said generated ringing signals;

dialing means operatively associated with said first position of said stepping switch means for applying dialing pulses to the telephone line in response to receipt of said second tone by said control receiver; and

talk means operatively associated with said second position of said stepping switch means for connecting said control transmitter means to the telephone line and energizing said control transmitter means.

PLANT PATENTS

GRANTED APRIL 12, 1977

Illustrations for plant patents are usually in color and therefore it is not practicable to reproduce the drawing.

4,038
FLOWERING CRAB APPLE TREE

James W. Zampini, Perry, Ohio, assignor to Lake County Nursery Exchange, Inc., Perry, Ohio

Filed Apr. 20, 1976, Ser. No. 678,538
Int. Cl.[2] A01H 5/03
U.S. Cl. Plt.—34 1 Claim

1. A new and distinct variety of flowering Malus crab apple tree, substantially as herein shown and described, characterized particularly by an upright, semi-dwarf growth habit, an arching and weeping effect of the branches, attractive pinkish colored flowers and abundant bright dark red colored fruits that may hang all winter, and which has apparent resistance to diseases which are common to most Malus species.

4,039
GERANIUM PLANT NAMED PEARLIE MAE RED

Griffith J. Buck, Ames, Iowa, assignor to Iowa State University Research Foundation, Inc., Ames, Iowa

Filed May 3, 1976, Ser. No. 680,151
Int. Cl.[2] A01H 5/00
U.S. Cl. Plt.—68 1 Claim

1. A new and distinct geranium cultivar substantially as herein shown and described, characterized by its profuse production of very large umbel-form inflorescence, its ability to flower throughout the year under glass, its generally shorter time requirement for initiation of inflorescence, and its ability to grow vigorously and flower profusely under high humidity and temperature conditions.

4,040
GERANIUM PLANT NAMED HAZEL

Griffith J. Buck, Ames, Iowa, assignor to Iowa State University Research Foundation, Inc., Ames, Iowa

Filed May 3, 1976, Ser. No. 680,152
Int. Cl.[2] A01H 5/00
U.S. Cl. Plt.—68 1 Claim

1. A new and distinct geranium cultivar substantially as herein shown and described, characterized by its abundant production of large umbel-form clusters of very large florets, the intense smoky rose coloring of its flowers, and its resistance to breakage by rain and wind.

4,041
GERANIUM PLANT NAMED MARIAN

Griffith J. Buck, Ames, Iowa, assignor to Iowa State University Research Foundation, Inc., Ames, Iowa

Filed May 3, 1976, Ser. No. 680,153
Int. Cl.[2] A01H 5/00
U.S. Cl. Plt.—68 1 Claim

1. A new and distinct variety of geranium plant substantially as herein shown and described, characterized by its vigorous, upright and much branched growth habit, its continuous and abundant flower production, and the tendency of its flower color to intensify under high temperature and high light conditions.

PLANT PATENTS

GRANTED APRIL 12, 1977

PATENTS

GRANTED APRIL 12, 1977

ERRATA

For CLASS	See PATENT NO.
403–404	4,016,703
141–226	4,016,910
273–001 R	4,016,937
273–134 AT	4,016,939
280–674	4,016,950
209–002	4,016,978
209–074 R	4,016,979
246–182 B	4,017,044
428–675	4,017,265
428–600	4,017,266
029–407	4,017,267
062–160	4,017,286
536–050	4,017,460
526–019	4,017,469
428–601	4,017,480
427–257	4,017,493
340–174 TF	4,017,604
358–196	4,017,676
358–127	4,017,677
358–128	4,017,678
358–111	4,017,679
358–242	4,017,680
358–171	4,017,681
358–167	4,017,682
361–088	4,017,765
361–083	4,017,766
361–117	4,017,767
361–399	4,017,768
361–419	4,017,769
361–399	4,017,770
361–357	4,017,771
361–428	4,017,772
361–433	4,017,773

PATENTS

GRANTED APRIL 12, 1977

ERRATA

Pa CLASS	Pa PATENT NO.
102-104	4,016,703
161-224	4,016,910
273-001 R	4,016,937
273-134 AT	4,016,939
280-674	4,016,950
209-002	4,016,978
209-074 R	4,016,979
346-182 D	4,017,044
422-075	4,017,265
423-650	4,017,266
029-027	4,017,267
063-160	4,017,295
156-090	4,017,460
526-019	4,017,469
423-650	4,017,480
427-257	4,017,572
340-174 TF	4,017,604
229-196	4,017,670
156-127	4,017,677
324-138	4,017,678
338-111	4,017,679
338-242	4,017,680
338-171	4,017,681
338-167	4,017,682
361-083	4,017,765
361-089	4,017,766
361-117	4,017,767
361-399	4,017,768
161-412	4,017,769
361-399	4,017,770
361-327	4,017,771
361-424	4,017,772
361-421	4,017,773

PATENTS

GRANTED APRIL 12, 1977

NOTE—A cross reference listing of applications published under the second Trial Voluntary Protest Program is located in the back of this Issue. These entries will be in numerical order by document publication number.

GENERAL AND MECHANICAL

4,016,604

STERILE BACK SURGICAL GOWN WITH ANCHORED BELT POUCH

Karen E. Welke, Roseville, Minn., assignor to Will Ross, Inc., Milwaukee, Wis.

Filed May 24, 1976, Ser. No. 689,194
Int. Cl.² A41D *13/00*
U.S. Cl. 2—51 **5 Claims**

1. In a sterile back surgical gown of the type in which there is a vertical back opening line, an inner back panel with a free edge parallel to the opening line, a closure panel having an open position wherein it is folded back on itself along a fold line parallel to the opening line with its free vertical edge toward one side of the gown, the closure panel being movable to an unfolded closed position wherein it extends across the opening line and overlaps the inner back panel with its free edge toward the other side of the gown to provide a sterile back for the gown, a first belt having a fixed end attached to the gown on said other side and forwardly of the free edge of the closure panel when the closure panel is in its closed position and a free end, a back belt that is tyable to the first belt and has a fixed end attached to the closure panel and a free end, a pocket on the closure panel that has an open end, the fixed end of the back belt being attached to the closure panel in the area covered by the pocket, the back belt being withdrawably stored in the pocket with only its free end protruding from the open end, and an elongated protective pouch having an open end and a closed end removably covering the free end of the back belt, said pouch having a portion including the open end thereof extending into said pocket, the improvement wherein: the pouch extends laterally beyond the free edge of the closure panel to define a holding portion facing an adjacent portion of said one side of the gown; and there is a releasable fastening means between the holding portion and adjacent gown portion.

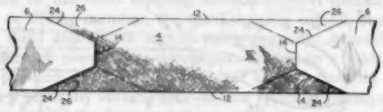
4,016,605

BELT ASSEMBLY

Donald Wyman Corey, Wilbraham, Mass., assignor to Buxton, Inc., Agawam, Mass.

Filed Aug. 13, 1976, Ser. No. 714,243
Int. Cl.² A41F *3/02*
U.S. Cl. 2—338 **4 Claims**

1. A belt assembly comprising an elongated backing strip, a first layer of material attached to said backing strip, said first layer comprising a plurality of material pieces disposed end-to-end, each of said pieces being flexible and octagonally shaped with two longest sides being parallel to each other and coincident with either longitudinal edge of said backing strip, two end edges of said piece being normal to said two longest sides of said piece, a second layer of material attached to said first layer, said second layer comprising a plurality of material pieces disposed end-to-end and in staggered relation to said



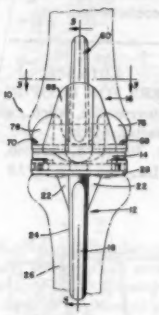
pieces of said first layer, said second layer pieces being flexible and of the same configuration as said first layer pieces.

4,016,606

KNEE JOINT PROSTHESIS

David George Murray, and James Henry Somerset, both of Syracuse, N.Y., assignors to Research Corporation, New York, N.Y.

Filed July 14, 1975, Ser. No. 595,739
Int. Cl.² A61F *1/24*
U.S. Cl. 3—1.911 **8 Claims**



1. A knee joint prosthesis comprising a tibial component; a tibial component insert; and a femoral component; said tibial component comprising an anchoring stem portion, one end of said stem portion adapted to be received in a longitudinal bore in a patient's tibia, the other end of said stem portion being integral with a table, the top surface of which is generally normal to the stem portion and having lateral edge flanges.

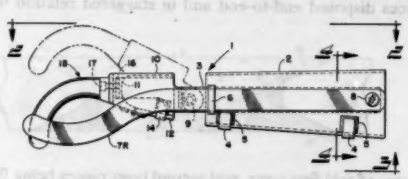
said tibial component insert comprising a plate shaped to be received on the tibial component table in locking engagement with the table edge flanges and the upper surface thereof having a centrally positioned spheroidal depression surrounded by a plane surface;

said femoral component comprising a stem, one end of said stem adapted to be received in a longitudinal bore in a patient's femur, the other end of said stem being integral with a depending generally spheroidal surface having generally the same radius as the radius of the spheroidal depression in said insert, said spheroidal surface having lateral shoulders each of which has a flat surface which engages the plane surface of the insert when the stems of the tibial and femoral components are in longitudinal alignment and a generally cylindrical surface having a radius of curvature about the axis of pivotal motion of the spheroidal surface with the spheroidal depression to permit rearward swing motion of the tibial component relative to the femoral component and relative axial rotation of said components.

4,016,607
ARTIFICIAL HAND

Eino Pihlaja, 101 Machar Avenue, Thunder Bay P, Ontario, Canada

Filed July 30, 1976, Ser. No. 710,028
Int. Cl.² A61F 1/06
U.S. Cl. 3—12 11 Claims

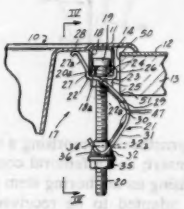


1. An artificial hand for an amputee having at least a portion of the metacarpus comprising a forearm gripping portion and a metacarpus gripping portion which are pivotally connected together on opposite sides to define pivots for positioning along opposite sides of the wrist; said forearm gripping portion having affixed on one side thereof a forwardly projecting thumb-like member; said metacarpus gripping portion having forwardly projecting curved finger-like members which upon movement of the metacarpus gripping portion about said pivots opens and closes said finger-like members with respect to said thumb-like member for respectively receiving and gripping an object therebetween.

4,016,608
SNAP FASTENERS FOR DROP-IN ASSEMBLIES

Aman Ullah Khan, Stevensville, Mich., assignor to Whirlpool Corporation, St. Joseph, Mich.

Filed Sept. 30, 1974, Ser. No. 510,397
Int. Cl.² E03C 1/18
U.S. Cl. 4—187 A 4 Claims



1. In a module construction having wall means forming an aperture and a modular package for insertion into said aperture, retainer means which allow insertion of said package into said aperture and retain said package against said wall means after said insertion, said retainer means comprising:

a support means adapted to be connected to the package;

stud means engaging said support means and extending downwardly therefrom;

a spring cam;

connection means connecting said spring cam to said stud and said support means;

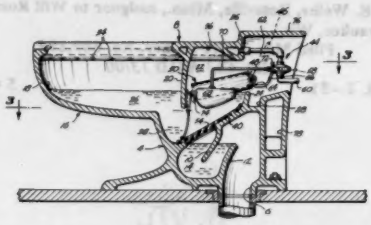
said spring cam comprising first and second camming surfaces inclined relative to one another and a curved knee portion joining said first and second camming surfaces said first camming surface acting against said wall means to move said spring cam to an unobstructing position to allow said insertion, and said second camming surface acting against said wall means to obstruct removal of said package after insertion and thereby retain said package in said aperture; and

an alignment means extending from said spring cam and said stud means beyond said support means to engage against a surface of said package.

4,016,609
FLUSH OPERATED SANITARY FACILITY

J. Thomas Graham, Rte. 6, Box 6343, Bainbridge Island, Wash. 98110

Filed May 14, 1975, Ser. No. 577,213
Int. Cl.² E03D 1/00, 3/00, 5/00
U.S. Cl. 4—10 9 Claims



1. In a sanitary facility, means defining a receiving bowl for liquid and/or solid excrement, having a discharge valve in the bottom portion thereof, means for controlling flow through the valve, including a pivotally mounted water receptacle which is operative to open the valve to flow when said receptacle is relatively inclined about its pivotal axis in a first position, and to close the valve to flow when said receptacle is relatively inclined about its pivotal axis in a second position relatively angularly spaced from said first position, means for supplying water to the bowl to form a pool of carrier liquid therein when the valve is closed, a control valve which is adapted to be interconnected to a source of pressurized water, control means which are responsive to the level of water in the bowl to close and open the control valve to flow as the water level rises and falls, respectively, hand or foot operated means for yieldably biasing the receptacle into the first relatively inclined position thereof, to open the discharge valve in the bowl to flow, and means providing a connection between the control valve and the receptacle whereby the receptacle is supplied with water when the control valve is open to flow, said receptacle being eccentrically mounted about its pivotal axis to pivot between the first and second positions thereof against the bias thereon, when the water accumulates to a predetermined level in the receptacle, thus closing the bowl discharge valve to flow, and there being means on the receptacle for discharging the water from the same when the receptacle assumes the second position thereof, to restore the receptacle to a neutral condition when the bowl discharge valve is closed.

4,016,610
COMBINATION BED AND DESK

Emil Ordonez, Las Vegas, Nev., assignor to Raymond Lee Organization, Inc., a part interest

Filed Sept. 15, 1975, Ser. No. 613,127
Int. Cl.² A47B 83/00
U.S. Cl. 5—2 R 1 Claim

1. A combination bed and desk, comprising:

a horizontal bed;

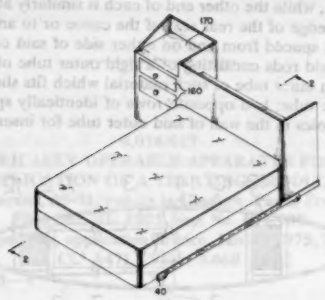
a vertical headboard attached to the front of the bed;

a bureau with a shelf and drawers located at one end of the headboard with the drawers being operable when pulled rearwardly and the shelf facing rearwardly;

a desk extending forwardly of the headboard and attached to it, so that the headboard forms the back of the desk;

a horizontal writing platform of approximately the width of the bed and slidably located in the desk so as to be slid-

able forwardly and rearwardly with respect to the headboard; and



a locking device cooperating with the platform and desk to fix the platform in the position to which it has been slid.

4,016,611

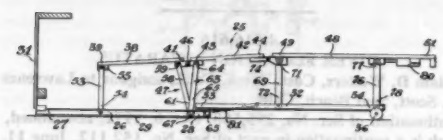
SOFA BED AND MECHANISM THEREFOR

M. Fillmore Harty, Bloomfield Hills, Mich., assignor to The Dow Chemical Company, Midland, Mich.

Filed Apr. 2, 1976, Ser. No. 673,338

Int. Cl.² A47C *17/10*

U.S. Cl. 5—13 **5 Claims**



1. A convertible couch mechanism, the convertible couch mechanism having a first or base member adapted to be disposed upon a floor or like support means, the first or base member having a back end and a front end, a first leg member having a first or pivot end and a second or support end, the first end of the first leg member being pivotly affixed to the base member at a location adjacent the back end and remote from the front end, a second or sliding member, the second or sliding member having a back end and a front end, the back end of the sliding member being slidably supported by the first or base member, the second or front end of the sliding member being supported or supportable by a floor or like support means, a first sleeping surface support means having a back end and a front end, the back end of the first sleeping support surface being pivotally affixed to the second end of the first leg, a second sleeping support surface having a back end and a front end, the back end of the second sleeping support surface being pivotally affixed to the front end of the first sleeping support surface, a second leg means pivotally affixed to first and second sleeping support means at the front and back ends respectively, the second leg means permitting rotation of the first and second support means about their pivotal connection by a rotation of about 90° to permit the first and second sleeping support means to be disposed in a generally parallel face-to-face relationship or alternately in general coplanar relationship, a third sleeping support means having a back end and a front end, the front and back ends of the second and third sleeping support means being pivotally affixed to permit rotation of the second support means at least about 90° about the back end of the third support means to permit rotation of the second sleeping support from the plane of the third sleeping surface support to a plane 90° thereto, the axes of pivotal connection between the first and second sleeping support surfaces and second and third sleeping support surfaces being generally parallel, a third leg means having a first end and a second end, the second end being pivotally affixed to the back end of the third sleeping support means, the first end being pivotally affixed to the front end of the second or sliding member, a fourth leg means having a first end and a second end, the first end of the fourth leg means being pivotally attached to the front end of the second or sliding member and the second end of the fourth leg means being pivotally affixed to the third sleeping surface support means at a location generally between the front end and the back end of the third sleeping surface support means, the second or sliding member, the third sleeping surface support means, third and fourth legs forming generally a parallelogram, thereby providing a mechanism which, in a folded or closed position, discloses the first and second sleeping supports in a generally vertical face-to-face relationship adjacent the first end of the base member and in the open position discloses the first, second and third sleeping supports in a generally planar configuration spaced from the base member and the sliding member.

4,016,612

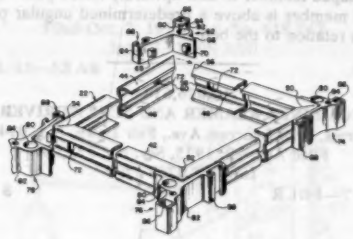
BED FRAME FOR HOSPITAL-TYPE BED

Peter Barile, Sr., 10381 Gulfshore Drive, Naples, Fla. 33940

Filed Nov. 19, 1975, Ser. No. 633,449

Int. Cl.² A47C *19/02*, *19/22*

U.S. Cl. 5—200 C **12 Claims**



1. A bed frame of open rectangular configuration defined by four right angularly meeting rail sections providing four corners, said rail sections being formed of at least one rail member, a bracket member positioned around each corner, the two rail sections at each corner having right angularly orientated bracket receiving surfaces, each bracket including a pair of generally right angularly directed legs lying against the right angularly orientated bracket receiving surfaces of the rail sections forming the corresponding corner, fastener means securing each leg to the corresponding bracket receiving surface for a locking of the bracket to the corner forming rail sections, at least a first one of said bracket legs having an extension thereon projecting laterally outward from the adjoining rail section, said extension including fixture attachment means for receiving and vertically orientating at least one fixture generally perpendicular to the bed frame and immediately outward thereof.

4,016,613

BALANCED BUMPER MEANS FOR FURNITURE

Roland Benoit, and Richard H. Duprey, both of Danielson, Conn., assignors to InterRoyal Corporation, New York, N.Y.

Filed Nov. 24, 1975, Ser. No. 634,399

Int. Cl.² A47C *21/00*

U.S. Cl. 5—317 R **4 Claims**

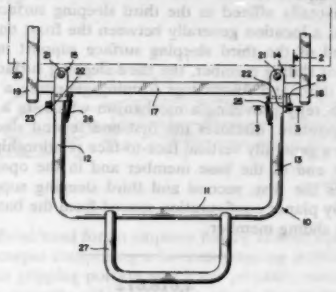
1. A bumper structure for hospital beds having legs with a cross bar therebetween comprising:

a pair of brackets for attachments to the cross bar at the front end of the bed;

a generally U-shaped bumper member having free ends each of which is secured to each of said brackets correspondingly; pivot members disposed between said brack-

ets and said U-shaped bumper member enabling accurate movement of said U-shaped member from lower extended position to upwardly raised position;

biasing means secured to a said bracket and a free end of said U-shaped bumper member adjacent said pivot member, said spring means automatically lowering said U-



shaped member to said lower extended position when said member is below a predetermined angular position with relation to the bed and automatically raising said U-shaped member to said upwardly raised position when said member is above a predetermined angular position with relation to the bed.

4,016,614

COMBINED REAMER AND SCREWDRIVER

Henry Press, 3-14 Lyncrest Ave., Fair Lawn, N.J. 07410

Filed Apr. 29, 1975, Ser. No. 572,637

Int. Cl.² B25F *1/00*

U.S. Cl. 7—14.1 R **8 Claims**

1. A combination tool which is both a screwdriver and a reamer or deburrer, which consists essentially of a handle and a blade which are unitary and essentially permanently fixed with respect to each other, which is free from moving or movable parts, said blade being of hard-tool quality metal; said blade having a widening portion adjacent the handle and an elongated shaft portion extending from the widening portion; sharp edge means formed along the entire length of said portions for reaming or deburring internal edges of cut conduit or tubing; and a screwdriver bit formed on the blade at the end of the shaft portion which is remote from the handle.

4,016,615

CANOE PORTAGING KIT

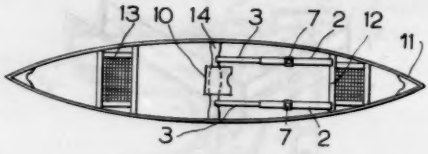
Glen A. Main, 9699 Esplanade, Windsor, Ontario, Canada (N8R 1J7)

Filed Nov. 3, 1975, Ser. No. 628,140

Int. Cl.² A45F *3/15*

U.S. Cl. 9—1.4 **2 Claims**

1. A kit for facilitating the portaging of canoes, comprising a pair of identical, spring loaded, telescoping carrying rods, one end of each being removably attached to the center bar of the canoe, while the other end of each is similarly attached to the front edge of the rear seat of the canoe or to an independent strut spaced from and on either side of said center bar; each of said rods consisting of a rigid outer tube of metal or plastic; an inner tube of such material which fits slidably into said outer tube; two opposite rows of identically spaced and located holes in the wall of said outer tube for inserting a pin



through said outer tube; a short spring located within said outer tube, one end of which rests upon said pin while the other end is in contact with the enclosed end of the inner tube; and a pair of identical notches, each notch located in the outer end of both said tubes, said notches being wide enough to contain therein the center bar, the front edge of the rear seat of the canoe, or the independent strut on either side of the center bar; and a cushion of soft material which is slipped over said center bar to provide comfort to the person carrying the canoe.

4,016,616

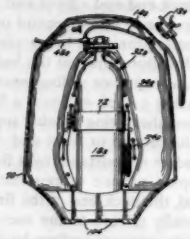
DIVER FLOTATION APPARATUS

William D. Walters, Costa Mesa, Calif., assignor to Lawrence S. Scott, Seal Beach, Calif.

Continuation of Ser. No. 295,508, Oct. 6, 1972, abandoned, which is a continuation-in-part of Ser. No. 152,112, June 11, 1971, abandoned. This application June 12, 1975, Ser. No. 586,505

Int. Cl.² B63C *11/30*

U.S. Cl. 9—339 **6 Claims**



3. Diver flotation apparatus comprising:

a back pack adapted to mount an air supply;

collapsible container means on said back pack and located over the back of the wearing diver, said container means defining a chamber for receiving air to both upwardly and downwardly adjust the overall buoyancy of the diver and his equipment, said container means being wholly disposed along the outer perimeter of said back pack;

flexible lacing securing said container means to said back pack thereby to enable relative movement between said container means and said back pack under wave action;

filling means on said back pack adapted to be coupled to said air supply and operative to apply air to said chamber, and including a valve operative by the diver to regulate the quantity of air passing from said air supply to said chamber; and

venting means including a valve operative by the diver to vent air from said chamber to the outside environment to

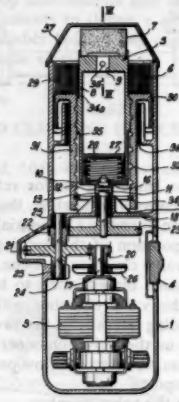
thereby adjust the positive buoyancy of the diver and his equipment.

4,016,617

ELECTRICALLY OPERABLE APPARATUS FOR THE APPLICATION OF A TREATING PRODUCT

Francis Cardus, 39-41, rue de la Glaciere, Paris, France

Filed Dec. 31, 1975, Ser. No. 645,909
Claims priority, application France, Jan. 6, 1975, 75.00265
Int. Cl.[2] A47L *23/06*; A46B *13/02*
U.S. Cl. 15—4 **7 Claims**



1. In electrically operable apparatus for the application of a treating product and selectively for subsequent buffing up of the surface treated and the working of the treating product thereinto, having a working head comprising a central applicator element for the product to be applied, an annular rotary brushing and rubbing element disposed about said central applicator element, one of said elements being axially movable with respect to the other of said elements to permit bringing said one of said elements into an axially projecting working position, an electric driving motor, a rotary driving shaft coupled to said motor, one of said elements being coupled to said driving shaft, the improvement which consists in that:

a. said motor is adapted to be rotatable in a first and in a second direction, and

b. said two elements are coupled by a coupling system adapted to cause axial displacement of said one of said elements with respect to the other of said elements, in one axial direction and then in the other axial direction, as a result of reversing the direction of rotation of said element coupled to said driving shaft.

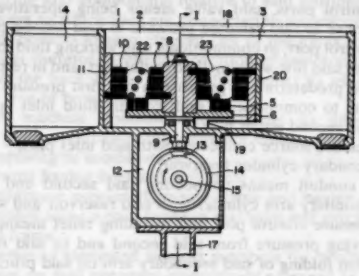
4,016,618

GOLF BALL WASHING MACHINE

Tadashi Kobayashi, 1560-2 Tenma, Fuji, Shizuoka, Japan

Filed Feb. 26, 1976, Ser. No. 661,694
Int. Cl.[2] A63B *47/04*
U.S. Cl. 15—21 A **5 Claims**

1. A golf ball washing machine, comprising a body having a circular golf ball wash chamber at the center of which are rotatably provided a lower brush disc and a central brush cylinder coaxially therewith, the inner peripheral surface of



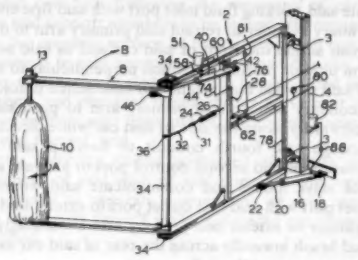
said wash chamber being detachably provided with a flexible belt-like brush plate.

4,016,619

CAR WASHING APPARATUS HAVING SLOW SPEED RELIEF

Ivan J. Barber, Mississauga, and Calvin Whetham, Weston, both of Canada, assignors to The Allen Group Inc., Melville, N.Y.

Filed Oct. 2, 1975, Ser. No. 618,742
Int. Cl.[2] B60S *3/00*
U.S. Cl. 15—53 AB **4 Claims**



1. Car washing apparatus having slow speed relief for washing the front, sides and rear of a car as it moves along a car path at a speed above a predetermined speed and comprising:

a horizontally projecting primary arm having first and second ends, said primary arm being pivotally supported on said first end at one side of the path of said car and extending rearwardly from said first end along said path;

a horizontally projecting secondary arm pivotally supported on one end from said second end of said primary arm and normally extending substantially transversely over said path;

bias means biasing said secondary arm to said normal position;

a brush carried on the free end of said secondary arm and rotatable about a vertical axis;

a primary arm fluid cylinder connected to said primary arm to retract and extend said primary arm, said primary arm cylinder having first and second ends;

a secondary arm fluid cylinder connected between said primary and secondary arms, said secondary arm cylinder having first and second ends and being operative in response to travel of said brush along said car path at said predetermined speed to retract its piston at a sufficient rate to develop a predetermined pressure in its second end, and upon unfolding of said secondary arm under the influence of said bias means to develop a selected pressure in said first end thereof;

control valve means having a working fluid inlet port and first and second working fluid outlet ports, said control valve means further including first and second pressure control ports, said valve means being operative in response to said selected pressure in said second pressure control port, to communicate said working fluid inlet port with said first working fluid outlet port, and in response to said predetermined pressure in said first pressure control port to communicate said working fluid inlet port with said second outlet port;

a pressure source connected with said inlet port;

a secondary cylinder reservoir;

first conduit means connecting said second end of said secondary arm cylinder with said reservoir and said first pressure control port and including relief means for relieving pressure from said second end to said reservoir upon folding of said secondary arm on said primary arm at a sufficiently slow rate to develop a pressure in said second end less than said predetermined pressure;

second conduit means connecting said first working fluid outlet port with said second end of said primary cylinder;

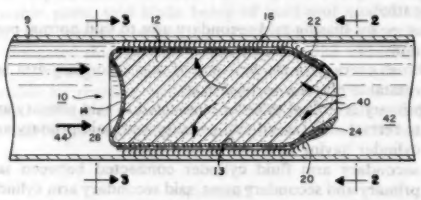
third conduit means connecting said second outlet port with said first end of said primary cylinder to retract said cylinder upon pressurization thereof; and

fourth conduit means connecting said first end of said secondary cylinder with said second control fluid port for delivery to said control port of said selected pressure upon unfolding of said secondary arm whereby contact of a car moving along said path with said brush above said predetermined speed will develop said predetermined pressure in said second end of said secondary cylinder to apply said predetermined pressure to said first control port to operate said control valve means and communicate said working fluid inlet port with said first end of said primary cylinder to retract said primary arm to draw said brush across the front of said car and as said secondary arm unfolds passing a position perpendicular to said path of said car said bias means will commence unfolding said secondary arm on said primary arm to push said brush rearwardly along the side of said car while directing fluid through said fourth conduit to develop said selected pressure in said second control port to activate said control valve means and communicate said working fluid inlet port with said first outlet port to extend said primary cylinder to extend said primary arm accordingly to urge said brush inwardly across the rear of said car as it clears the rear corner thereof.

4,016,620
PIPELINE CLEANING PIG

Marvin D. Powers, Houston, Tex., assignor to Pipeline Dehydrators, Inc., Houston, Tex.

Filed May 22, 1975, Ser. No. 580,109
Int. Cl.² B08B 9/04
U.S. Cl. 15—104.06 R **7 Claims**



1. A pipeline scrapping pig comprising:

a cylindrical body made of resilient, open-cell foam,

a flexible, impervious jacket substantially completely covering the foam, said jacket having an opening in at least one end of the pig, and

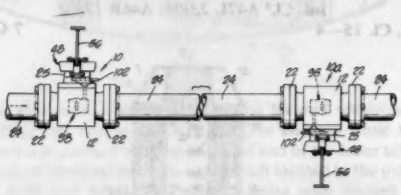
abrasive means substantially completely covering the outer surface of said jacket, said abrasive means comprising a web backing, and

steel bristles projecting outwardly from said backing.

4,016,621
DEVICE AND METHOD FOR LAUNCHING AND/OR RETRIEVING PIPELINE SCRAPERS

Maurice Siegers, Lakewood, and John D. Muchow, Cerritos, both of Calif., assignors to Willis Oil Tool Co., Long Beach, Calif.

Filed June 6, 1975, Ser. No. 584,375
Int. Cl.² B08B 9/04
U.S. Cl. 15—104.06 A **10 Claims**



1. In a device for launching and/or retrieving a pig for cleaning out a fluid-conveying pipeline, the combination of:

a housing structure forming (1) coaxial inlet and outlet ports for incorporation of the housing structure in the pipeline, (2) a valve chamber between the two ports and (3) a pig magazine dimensioned to house the pig and opening onto the valve chamber with the axis of the magazine extending laterally of the two ports;

a valve member in the valve chamber and cooperating therewith to form a continuous flow passage between the inlet and outlet ports;

a passage through the valve member,

one end of said passage being a cavity to hold the pig;

means at the opposite end of the passage to prevent escape of the pig therethrough whle permitting fluid flow therethrough between the two ports,

said valve member being rotatable about an axis perpendicular to the axis of the two ports in a plane of rotation that includes the axis of the magazine and the axes of the two ports to permit rotating said cavity into register with the magazine and at least one of the two ports selectively;

a normally closed closure for the magazine to permit access to the magazine from the exterior of the housing structure; and

a valve seat forming a flow passage between the magazine and the valve chamber and being cooperative with the valve member to seal off the magazine from the valve chamber.

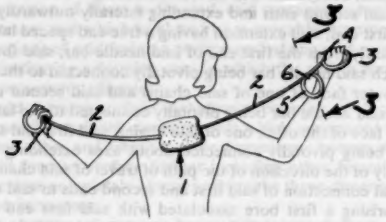
4,016,622
BATH SPONGE

Carl H. Eisenman, 1609 E. 27th St., Minneapolis, Minn. 55407

Filed July 14, 1975, Ser. No. 595,572
Int. Cl.² A47K 7/02
U.S. Cl. 15—222 **1 Claim**

1. A bath sponge comprising; a generally rectangular body of sponge-like hydrophilic material, an elongated flexible cord extending longitudinally through said body, said cord having closed loops at its opposite ends defining primary handle elements longitudinally spaced from said body, means for tying said ends of the cord in looped formation, means for restricting movement of said body longitudinally of said cord and comprising a pair of stop elements each operatively engaging a respective end of said body, said stop elements being spaced apart longitudinally of said cord a distance less than the normal longitudinal dimension of said body, whereby the

body adjacent said cord is compressed between said stop elements, the opposite ends of said body defining recesses containing said stop elements, said cord being formed to

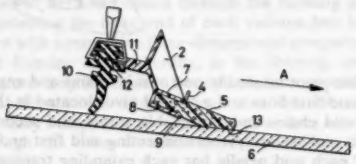


provide a third loop intermediate said body and one of said primary handle elements to define a secondary handle element, and a tie member holding said cord looped to provide said secondary handle element.

4,016,623
WINDSHIELD CLEANING DEVICE FOR MOTOR VEHICLES

Hans Willi Nixdorf, 105a Bockumerstrasse, Dusseldorf, Germany

Filed Nov. 19, 1975, Ser. No. 633,563
Int. Cl.² B60S 1/46
U.S. Cl. 15—250.03 **14 Claims**



1. Windshield cleaning device for use in conjunction with a reciprocable wiper blade of a motor vehicle comprising: an essentially trough-shaped receptacle having wall means defining an inner chamber for the accommodation of cleansing means and having an opening on at least one side in a direction away from the windshield, mounting means projecting from the receptacle at the side facing away from the at least one open side of the inner chamber, for the releasable attachment of the device to one side of the wiper blade, an applicator means disposed adjacent the opening along an outer edge of said wall means defining a space between said applicator means and said wall means to allow water to enter therebetween to contact said cleansing means, which applicator means receives from the inner chamber the cleansing means dissolved by the water and applies it to the windshield wiped by the wiper blade, the device being so mounted on the wiper blade that the applicator means effectively lies upon the windshield when the receptacle and applicator means precede the wiper blade in the direction of movement, and is lifted away from the windshield when the wiper blade is moved in the opposite direction.

4,016,624
POULTRY CUT-UP MACHINE

Eugene G. Martin, Ephrata, and Harold C. Martin, Leola, both of Pa., assignors to Victor F. Weaver, Inc., New Holland, Pa.

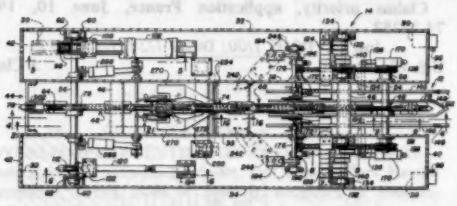
Filed Oct. 17, 1975, Ser. No. 623,301
Int. Cl.² A22C 21/00
U.S. Cl. 17—11 **55 Claims**

43. A method of separating dressed poultry carcasses into certain normal commercial components comprising the steps,

1. extending such components from the portion of the carcass to which they are connected by ball and socket joints to tension the connecting tendons of said joints,
2. severing at least the major connecting tendons by which said components are connected to said carcass, and
3. moving said components relative to said portions of the carcass to which they are connected in separative direction, thereby to separate said ball of the joints from the socket therefor to effect separation of said components from the back of said carcass in a manner by which they are free of bone fragments.

47. A machine operable automatically to dismember dressed poultry carcasses into separate components thereof and comprising in combination:

a. a frame having inlet and exit ends,
b. a conveyor supported by said frame and having a span movable along a path between said inlet and exit ends of said frame,
c. a series of elongated support members for poultry carcasses on said conveyor respectively arranged to be inserted longitudinally into poultry carcasses uniformly from one end thereof and directly engaging one surface of the backs of said carcasses,

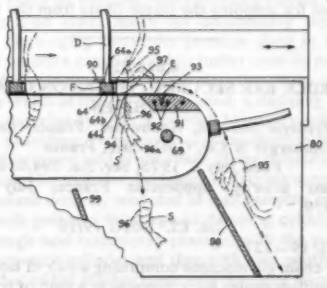


d. clamping means carried by said conveyor and activated by said conveyor following the mounting of carcasses upon said support members to be moved into engagement with the opposite surface of the back of each carcass in opposition to said support members and thereby firmly clamp said backs of said carcasses between said support members and clamping means during movement of said carcasses from said inlet end of said frame toward said exit end thereof, and
e. carcass disecting means positioned along the path of movement of said span of said conveyor and operable sequentially to separate components of said carcasses from said backs thereof while said backs are clamped as described.

4,016,625
APPARATUS FOR SIZING AND DEHEADING SHRIMP

Edwin B. Mitchell, P.O. Box 1042, Beaufort, S.C. 29902

Continuation of Ser. No. 512,452, Oct. 7, 1976, abandoned.
This application July 19, 1976, Ser. No. 706,832
Int. Cl.² A22C 29/02
U.S. Cl. 17—71 **8 Claims**



1. A shrimp deheading apparatus comprising:
a stationary blade;
conveyor means carrying shrimp positioned for reception

against said blunt blade adjacent a joint between a head and a body portion; and

an abutment carried by said conveyor means pushing the head of each shrimp toward said stationary blade, said abutment passing thereby causing said heads to be sheared off adjacent said joint separating said head and body.

4,016,626

APPARATUS FOR SIMULTANEOUSLY TEXTURIZING AND CUTTING CONTINUOUS YARNS

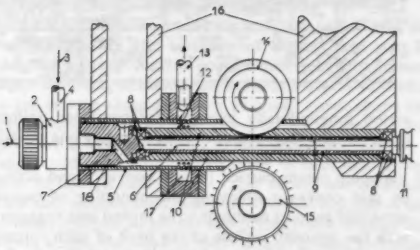
René Guillermin, Bron; Jean Joly, Craponne, and Sylvio Sangalli, Caluire, all of France, assignors to Rhone-Poulenc-Textile, Paris, France

Division of Ser. No. 583,913, June 5, 1975. This application Jan. 20, 1976, Ser. No. 650,796

Claims priority, application France, June 10, 1974, 74.20252

Int. Cl.² D01G *1/00*; D02G *1/20*, *1/16*, *1/12*

U.S. Cl. 19—.46 **5 Claims**



1. Apparatus for continuously texturizing and cutting at least one multifiliment continuous yarn, wherein the yarn is texturized by fluid pressure, said apparatus comprising:

an injecting device which includes at least one orifice for feeding said multifiliment yarn into the apparatus and one orifice for introducing a texturizing fluid;

a cylindrical tube connected to the injecting device wherein the cylindrical tube has a constant cross-section and includes lateral orifices for exhausting the fluid and is connected at one end with the injecting device;

a revolving spindle positioned in the cylindrical tube wherein the revolving spindle includes a rotating part adjacent the injection device wherein the rotating part is provided with an internal feed tube through which passes the multifiliment yarn and a fixed sleeve around which the yarn is wound to form a stuffed pack of yarn between the fixed sleeve and cylindrical tube;

at least one cutting means for cutting the pack of yarn wound on the sleeve into a plurality of staple fibers, and means for stripping the staple fibers from the sleeve.

4,016,627

NEEDLE BAR SECURING MEANS ON CHAIN GILL MACHINES

Jean Frederic Herubel, Guebwiller, France, assignor to N. Schlumberger & Cie, Guebwiller, France

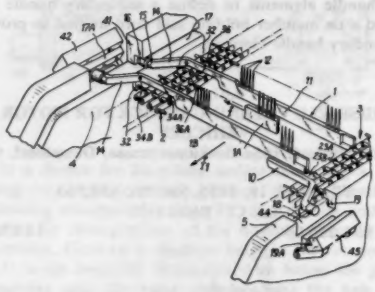
Filed July 8, 1975, Ser. No. 594,059

Claims priority, application France, July 15, 1974, 74.24479

Int. Cl.² D01G *19/10*

U.S. Cl. 19—127 **6 Claims**

1. A chain gill machine comprising a pair of laterally spaced apart endless chains each movable in a path of travel substantially parallel to the path of travel of the other said chain and each said chain having an inner lateral face directed toward the inner lateral face of the other said chain and an outer lateral face directed away from the other said chain, a plurality of substantially parallel elongated needle bars extending transversely of and removably mounted on said chains, each of said needle bars having a first end, a second end and an extension bent relative to the bar extending between said first and said second ends and extending laterally outwardly from said first end, said extension having a free end spaced laterally outwardly from the first end of said needle bar, said first end of each said needle bar being pivotally connected to the laterally outer face of one of said chains and said second end of each said needle bar being pivotally connected to the laterally inner face of the other one of said chains, said first and second ends being pivotally connected about axes extending transversely of the direction of the path of travel of said chains, the pivotal connection of said first and second ends to said chains comprising a first bore associated with said first end and a second bore formed in said second end of each said needle bar



and a first pivot located in one of said chains and engageable within said first bore and a second pivot located in the other one of said chains and engageable within said second bore, said first and second pivots connecting said first and second ends of each said needle bar each extending transversely of said chains in the same lateral direction therefrom, and means spaced laterally outwardly from each of said chains and forming a fixed cam groove facing toward the outer lateral face of the adjacent said chain and disposed in parallel relation to the adjacent said chain, and the free end of said extension being engaged in one of said fixed cam grooves and being movable therethrough with the free end of said extension being positioned relative to the base of said fixed cam groove so that said needle bar from which said extension extends is secured against movement in the axial direction of its pivotal connection to said chain adjacent said fixed cam groove whereby said needle bar is retained in pivotal connection with said chains.

4,016,628

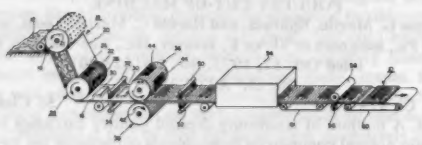
METHOD AND APPARATUS FOR FORMING ABSORBENT ARTICLES

Charles C. Kolbach, Media, Pa., assignor to Scott Paper Company, Philadelphia, Pa.

Division of Ser. No. 360,124, May 14, 1973, Pat. No. 3,860,002. This application Aug. 12, 1974, Ser. No. 496,622

Int. Cl.² D04H *1/70*

U.S. Cl. 19—148 **5 Claims**



1. An apparatus capable of use in forming an absorbent, air-laid, nonwoven fibrous web having regions of different

basis weights therein, said apparatus including a fiberizing means for separating fibers from a feed mat and entraining said separated fibers in air to form an air suspension of fibers, a formation chamber including a passageway into which said air suspension of fibers is directed, said passageway having a downstream end which is closed by a movable forming surface, regions of said forming surface underlying said passageway constituting a forming area in which the web is formed; the improvement wherein:

A. said forming surface including a plurality of discrete, three-dimensional compartments which are spaced from each other and which include foraminous bottom walls, said forming surface further including other foraminous sections completely circumscribing the three-dimensional compartments;

B. a plurality of vacuum boxes being spaced from each other and having open ends underlying respective three-dimensional compartments, the other foraminous sections extending beyond the open ends of said vacuum boxes;

C. first vacuum connection means communicating with said vacuum boxes for permitting the establishment of a desired pressure drop through the bottom walls of the three-dimensional compartments;

D. second vacuum connection means communicating with the other foraminous sections of the forming surface for permitting the establishment of a desired pressure drop through said other foraminous sections of said forming surface; and

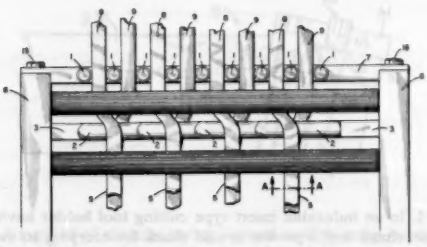
E. drive means for moving the forming surface and vacuum boxes at the same speed through the forming area for maintaining the open end of each vacuum box in alignment with a respective three-dimensional compartment in said forming area, whereby, in the forming area, the pressure drop established through the bottom walls of the three-dimensional compartments can be selected substantially independently of the pressure drop established through the other foraminous sections of the forming surface.

4,016,629

FIBER BLENDING MECHANISM

Roger S. Brown, New Orleans; Charles L. Shepard, Chalmette, and Laurey J. Richard, Metairie, all of La., assignors to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.

Filed May 22, 1975, Ser. No. 580,093
Int. Cl.² D01G 5/00
U.S. Cl. 19—243 **6 Claims**



1. An apparatus for the blending of fibers installed in the back drafting zone of a conventional drawing frame and comprising in combination:

a. a means of guiding alternating cotton and synthetic fiber slivers, said means comprising:

1. a series of vertical cylindrical pins;

2. a horizontal bar to which said pins are attached;

3. a vertical frame to which said horizontal bar is affixed at said horizontal bar ends;

4. a base plate to support said vertical frame;

b. a first set of drafting rolls located parallel to and forward of said guiding means, to receive said synthetic fiber sliver from said guiding means;

c. a frame to which said first set of drafting rolls are mounted;

d. an angular cross-over guiding means, located parallel to and forward of the first set of drafting rolls, said cross-over guiding means angled and positioned to separate, deflect and perfectly overlay the alternating cotton and synthetic slivers into composite slivers;

e. a second set of drafting rolls located parallel to and forward of the cross-over guiding means, said second set of drafting rolls receiving the composite slivers from the angled guiding means and drafting them into a homogeneous blend;

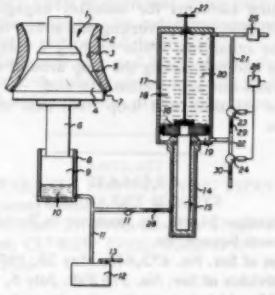
f. the frame of (c) for mounting said second set of drafting rolls.

4,016,630

OVERLOAD PREVENTING DEVICES IN CRUSHERS

Berndt Harry Bengtsson, Lindome, and Sten Anders Harald Bremmer, Arbra, both of Sweden, assignors to Svedala-Arbra AB, Sweden

Filed June 30, 1975, Ser. No. 591,623
Claims priority, application Sweden, July 2, 1974, 7408697
Int. Cl.² B02C 2/04
U.S. Cl. 241—207 **14 Claims**

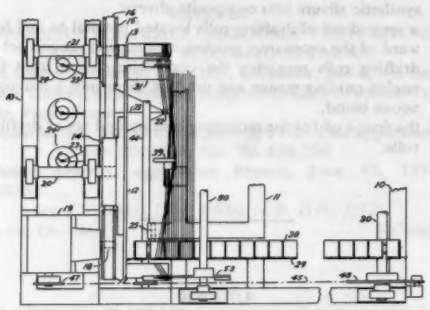


1. A crusher comprising a crusher cone and a crushing liner defining a crusher nip therebetween, a substantially vertical pressure cylinder having an upper and a lower space, the crusher cone having a central supporting member extending into said upper space and being supported for axial movement in said upper space on pressure fluid contained therein, means connected to said lower space for controllably supplying thereto and discharging therefrom pressure fluid in dependence on the pressure exerted on the crusher cone by material to be crushed in said nip, whereby the elevation of the crusher cone and the width of the nip are adjusted; a damping means comprising a damping cylinder, a conduit having a constricted passage and providing a continuous communication for said pressure fluid between said lower space of the pressure cylinder and the damping cylinder, said damping means comprising first piston means movably mounted in said damping cylinder to interact with pressure fluid in said damping cylinder and thereby, through said constricted passage, with the pressure fluid in the pressure cylinder and thus with said central supporting member of the crusher cone, said damping means also comprising preloading means acting with a substantially constant pressure on said piston against the action of said pressure fluid both during normal operation and during overload thereof.

4,016,631
APPARATUS AND METHOD FOR TRAVERSING A STRAND

Paul Morrison Cole, 1213 Hillside Blvd., Carrcroft, Wilmington, Del. 19803

Filed Feb. 10, 1976, Ser. No. 656,975
Int. Cl.² D04H 3/05
U.S. Cl. 28—1 CL 24 Claims



1. An apparatus for traversing a strand between two spaced rows of strand-restraining elements moving together in the same approximate direction to form a web, said apparatus comprising:

a strand supply source;

a guide between said rows for receiving the strand from said supply source;

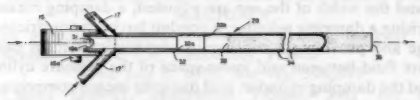
a strand-engaging member orbiting each row of strand-restraining elements for slideably engaging the strand near said guide and traversing said strand toward one and then the other row while forming a loop during each traverse and positioning the loop around at least one of said strand-restraining elements; and

means for releasing said loop from said strand-engaging member.

4,016,632
STRAND TREATMENT

Robert K. Stanley, Media, Pa., assignor to Textured Yarn Co., Inc., Kennett Square, Pa.

Continuation of Ser. No. 473,443, May 28, 1974, abandoned, which is a division of Ser. No. 376,890, July 5, 1973, Pat. No. 3,952,385, which is a continuation-in-part of Ser. Nos. 343,644, March 22, 1973, Pat. No. 3,840,950, and Ser. No. 124,213, March 15, 1971, Pat. No. 3,753,275, which is a continuation-in-part of Ser. No. 822,429, May 7, 1969, Pat. No. 3,570,083, which is a continuation-in-part of Ser. No. 678,428, Oct. 26, 1967, Pat. No. 3,462,814, and Ser. No. 302,758, July 31, 1963, Pat. No. 3,376,622. This application Nov. 18, 1975, Ser. No. 633,009
Int. Cl.² D02G 1/20, 1/16, 1/12
U.S. Cl. 28—72.11 10 Claims

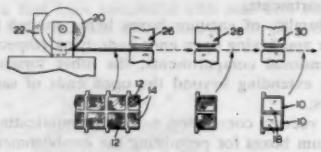


1. Method of crimping a textile strand, comprising nipping said textile strand from opposite sides in the vicinity of the entrance to a strand-confining region having an exit therefrom and thereby feeding the strand toward the entrance, and jetting fluid onto the strand between the nipping location and the entrance in an oblique downstream direction, confining said jetted fluid between said jetting step and said region, and thereby forwarding the strand into the entrance to the confining region, and confining the strand from the jetting step to the confining region, and releasing said jetted fluid downstream of its confinement.

4,016,633
BATTERY PLATE GRID

Carleton H. Smith, 34 North Drive, Islington, and Kenneth G. Dunning, 413 Vancouver Crescent, Oshawa, both of Canada

Division of Ser. No. 497,742, Aug. 15, 1974, abandoned. This application Feb. 6, 1976, Ser. No. 655,758
Int. Cl.² B23P 13/00
U.S. Cl. 29—2 3 Claims



1. A method of making flat lead storage battery plate grids that have a perimeter frame and a lattice network within the frame, the lattice network being of lesser thickness than the perimeter frame and having the planes of its opposed faces spaced between the planes of the opposed faces of the perimeter frame comprising the steps of:

casting a continuous series of grid plates between a continuously rotating patterned drum and a rigid smooth surfaced shoe;

flattening said grip plates whereby to achieve a grid plate wherein the plane of one face of the lattice work is coplaner with one face of the perimeter frame;

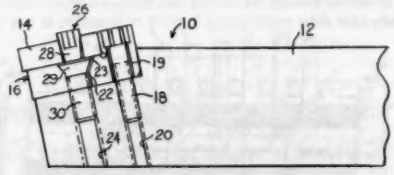
displacing the lattice network to locate the planes of both opposed faces thereof between the opposed faces of the perimeter frame; and

separating the grid plates of said series.

4,016,634
INDEXABLE INSERT TYPE CUTTING TOOLHOLDERS

William E. Barnes, Mount Clemens, Mich., assignor to Empire Tool Company, Memphis, Mich.

Filed Apr. 19, 1976, Ser. No. 678,111
Int. Cl.² B26D 1/00
U.S. Cl. 29—96 2 Claims



1. In an indexable insert type cutting tool holder having a steel shank and a pocket in said shank for carrying an indexable insert therein, the pocket being defined by floor and wall surfaces, the floor being formed at a predetermined rake angle with respect to the orientation of the shank, and the wall surface being essentially perpendicular to the floor, and said insert having a plurality of peripheral cutting edges and a central aperture therein by which it is held in place in said toolholder the improvement of a cartridge fitted in the pocket in said shank, the cartridge including a bottom wall surface and a rear face which are respectively in abutment with essentially the entirety of the floor and face surfaces in the pocket of the shank in order to shield such pocket surface from nicks and dents, the cartridge further including a step in its upper

surface defining a pocket to receive the insert and an enlarged head portion extending away from the pocket floor surface of the shank at a direction essentially perpendicular thereto, the enlarged head including an aperture therethrough mating with a threaded aperture in the floor of the shank pocket, and a retainer member extending through the head aperture and being threadedly received in the floor aperture to secure the cartridge in position; said cartridge being formed of a high speed steel harder than that of said shank but less than that of said insert, said cartridge retaining its hardness even when heated to cherry red heat, and means for fastening said insert securely in place in said cartridge pocket, including a threaded fastener extending through the central aperture of the insert and into both a mating fastener aperture in the cartridge and a mating fastener aperture in the shank, the cartridge aperture including a frusto-conical countersink in the pocket adjacent the insert, with the countersink being offset toward the enlarged head with respect to the center of the remainder of the fastener aperture in the cartridge, and the threaded means for fastening the insert including a lock pin having an enlarged major head portion in engagement with the central apertured portion of the insert and an intermediate enlarged frusto-conical portion which engages the countersink in the cartridge, with the cartridge countersink providing a fulcrum point adjacent the insert to reduce the lever arm between such fulcrum point and the region of contact between the insert and the major head portion.

4,016,635

METHOD OF MANUFACTURING PISTON SEALING STRIPS OF ROTARY PISTON MACHINES

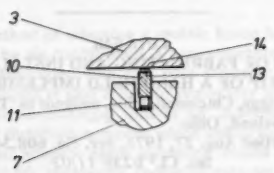
Wulf Leitermann, Bad Wimpfen, and Hans-Georg Zimmermann, Heilbronn, both of Germany, assignors to Audi NSU Auto Union Aktiengesellschaft, Neckarsulm and Wankel GmbH, Lindau Bodensee, both of, Germany

Filed July 15, 1975, Ser. No. 596,156

Claims priority, application Germany, July 19, 1974, 2434838

Int. Cl.² B23P *15/06*

U.S. Cl. 29—156.6 **4 Claims**



1. A method of manufacturing arcuate sealing strips for the side faces of piston of rotary piston machines, the strips having a maximum and a minimum permissible radius of curvature comprising the steps of; winding a metal band having a cross-section of the sealing strips in a spiral roll the outer radius of which being equal to or smaller than the maximum permissible radius of curvature of the sealing strips and the inner radius of which being equal to or greater than the minimum permissible radius of curvature of the sealing strips, applying a wear-resistant layer to one end face of the roll, unwinding the roll and cutting up the band into individual sealing strips each having a radius of curvature within the maximum and minimum tolerance limits.

4,016,636

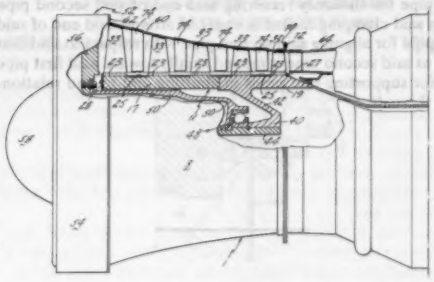
COMPRESSOR CONSTRUCTION

Raymond P. Schneider, North Palm Beach; James F. Marshall, Lake Park, and Maclean Crowell, Jupiter, all of Fla., assignors to United Technologies Corporation, Hartford, Conn.

Division of Ser. No. 491,030, July 23, 1974. This application Nov. 26, 1975, Ser. No. 635,558

Int. Cl.² B23P *15/04*

U.S. Cl. 29—156.8 R **2 Claims**



1. A method of forming a compressor comprising:
1. forming a drum rotor,
2. placing a plurality of axial slots around the periphery of said drum rotor,
3. aligning a stator case having fixed circumferential rows of vanes therein with said drum rotor,
4. forming blade sticks, each having a plurality of blades along its length with an elongated root,
5. placing each blade stick in said stator case with blades between the vanes of said stator case and with its root aligned with a slot on said drum rotor,
6. moving said stator case and blade sticks relative to said drum rotor so that the blade roots of said blade sticks are positioned within the slots of the drum rotor.

4,016,637

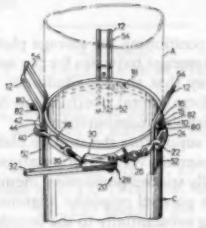
APPARATUS FOR ALIGNING PIPES

Donald E. Swensen, Valders, Wis. 54245

Filed Mar. 29, 1976, Ser. No. 671,079

Int. Cl.² B23P *19/00;* **B23K** *37/04*

U.S. Cl. 29—281.4 **5 Claims**



1. A removable alignment jig for use in axially aligning and supporting pipes in abutting end-to-end relationship to facilitate their being secured together, said jig comprising: clamping means for clampingly engaging a first pipe near but axially spaced from an end thereof in rigid non-slideable engagement, said clamping means including a flexible band having opposite ends, a clamp assembly connected to one end of said flexible band and means for releasably engaging said clamp assembly with the other end of said flexible band, said flexible band comprising at least two substantially rigid curvilinear members and hinge means for hingedly securing said members together, and a plurality of guide means for slideably receiving an end of

a second pipe while said clamping means clampingly engages said first pipe and for guiding and supporting said second pipe in axial abutting alignment with said first pipe, said plurality of guide means each being rigidly secured to said flexible band and positioned in spaced relationship with respect to each other, said guide means each including an elongated portion extendable along and beyond the said end of said first pipe in parallel non-sliding relationship and an elongated outwardly diverging end portion extendable beyond the said end of said first pipe for slideably receiving said end of said second pipe when said clamping means is engaged around said end of said first pipe for aligning said second pipe with respect to said first pipe as said second pipe is moved axially toward said first pipe and for supporting said pipes in abutting end-to-end relationship thereafter.

4,016,638

DEVICE FOR ASSEMBLING THE STORAGE PLATES AND INSULATING PLATES OF LEAD-ACID BATTERIES

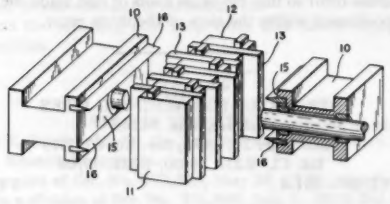
Jürgen Klein, Brilon, Germany, assignor to Accumulatorenwerk Hoppecke Carl Zoellner & Sohn, Cologne, Germany

Filed Dec. 22, 1975, Ser. No. 642,772

Claims priority, application Germany, Dec. 20, 1974, 2460418

Int. Cl.² H01M *2/00*

U.S. Cl. 29—730 **3 Claims**



1. A device for positioning the storage plates and insulating plates of lead-acid storage batteries for the assembly of battery cells in such a way that the longitudinally larger insulating plates form a uniform lateral overhang on both lateral sides, the device comprising in combination:

plate means for supporting the storage plates and insulating plates in a generally vertical orientation;

two longitudinally spaced positioning members having abutment faces in parallel opposite alignment, at a distance corresponding substantially to the length of the insulating plates, thereby positioning the latter;

at least one positioning knife protruding inwardly from each positioning member to a distance substantially equal to the intended lateral overhang of the insulating plates relative to the storage plates, so that opposing knife edges define between them a longitudinal distance which is substantially equal to the lesser length of the storage plates, thereby centrally positioning the storage plates with respect to the insulating plates, and whereby the edge portions of the insulating plates have notches cut into them by the protruding positioning knives; and

means for longitudinally retracting and advancing at least the knives themselves, for the insertion and removal of the insulating plates.

4,016,639

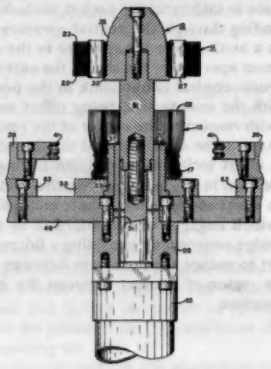
APPARATUS AND METHOD FOR STRIPPING WINDINGS FROM A STATOR

Frank R. Dombrowski, Kingston, and Raymond L. Larson, Sycamore, both of Ill., assignors to General Electric Company, Fort Wayne, Ind.

Filed Jan. 23, 1975, Ser. No. 543,505

Int. Cl.² B23Q *17/00*; B26D *1/04*

U.S. Cl. 29—762 **15 Claims**



1. Apparatus for stripping from a dynamoelectric machine stator a plurality of windings thereof with one of a pair of opposite generally annular groupings of end turns severed therefrom, said apparatus comprising means movable between a mounting position and a displaced position for seating the stator and supporting it in both the mounting and displaced positions, means for gripping engagement with the other of the end turns when said seating and supporting means is in the mounting position to generally maintain the windings against displacement from the mounting position, means for actuating said gripping means into the engagement with said other end turns, and means operable independently of said actuating means for driving said seating and supporting means from the mounting position toward the displaced position so as to conjointly move the stator relative to the windings and effect the stripping of the windings from the stator when said gripping means is engaged with the other end turns.

4,016,640

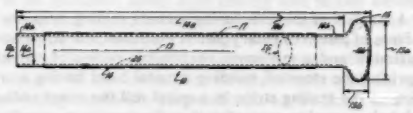
METHOD OF FABRICATING AND INSTALLING THE GRIP OF A HAND-HELD IMPLEMENT

Robert E. Briggs, Cincinnati, Ohio, assignor to 'Totes' Incorporated, Loveland, Ohio

Filed Aug. 27, 1975, Ser. No. 608,348

Int. Cl.² B23P *11/02*

U.S. Cl. 29—450 **8 Claims**



1. A method of providing a grip on the handle of a hand-held implement, said implement having a free end type handle, and said grip being comprised of a tubular member open at one end and a boot integral with said tubular member that closes its other end, said method comprising

dipping, into an elastomeric latex, a male mandrel having

said grip's approximately as-produced and before-installation size, geometry, and exterior surface characteristics to form said grip, said grip being provided with an average internal girth between about 5 and about 50% less than the average external girth of said handle for that portion of said handle on which said grip is to be mounted, an average wall thickness of between about 0.01 inches and about 0.10 inches, a percentage elongation at break between about 400 and about 1000%, a tensile strength at break between about 2000 psi and about 6000 psi, and a modulus at 200% elongation between about 100 psi and about 500 psi,

stripping the latex skin from said mandrel after said skin has cured, said skin being turned inside out as same is stripped, thereby orienting the as-produced grip's exterior surface on the outside of said grip,

exposing the exterior surface of said grip to a vacuum sufficient to expand said grip throughout its longitudinal axis, said expansion being sufficient to permit said implement's handle to be inserted therein without touching the interior surface of said grip while the exterior surface is exposed to said vacuum,

orienting the free end of said implement's handle adjacent the open end of said grip,

inserting said implement's handle into said grip free end first until said free end bottoms out adjacent said grip's boot, bottoming out of said free end adjacent said boot serving to properly position said handle relative to said grip, and

thereafter releasing said vacuum from the exterior of said grip, same permitting said grip to contract into a friction fit relation with said implement's handle.

4,016,641

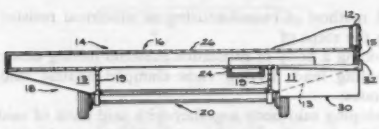
METHOD OF ADAPTING A MOBILE HOME FOR AN AIR CONDITIONER

Roy W. Abbott, Louisville, Ky., assignor to General Electric Company, Louisville, Ky.

Division of Ser. No. 541,665, Jan. 16, 1975, Pat. No. 3,973,939. This application Mar. 8, 1976, Ser. No. 664,664

Int. Cl.² B23P *21/00*

U.S. Cl. 29—469 **9 Claims**



1. The method of adapting a mobile home having at least one zone to be air conditioned, a base structure, air distribution means associated with said base structure including air outlets positioned in said zone, for removably receiving a self contained air conditioning unit in air delivering alignment with said air distribution means which comprises:

securing an adaptor plate mounting means to said base structure for removably receiving said air conditioning unit;

connecting an air delivery system between said adaptor plate and said air distribution means.

5. The method of air conditioning a mobile home having at least one zone to be air conditioned, a base structure, air distribution means associated with said base structure including air outlets positioned in said zone, for removably receiving a self-contained air conditioning unit in air delivering alignment with said air distribution means which comprises:

securing an adaptor plate mounting means to said base structure for removably receiving said air conditioning unit;

connecting air delivering means between said adaptor plate and said air distribution means; and

inserting said air conditioning unit in said adaptor plate so that said air conditioning unit is in alignment with said air delivering means for circulating air into said mobile home zones through said air distribution means.

4,016,642

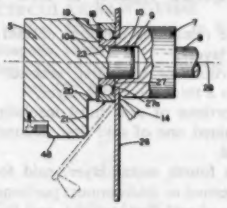
METHOD OF MAKING CLUTCH HOUSING AND BEARING ASSEMBLY

Derald H. Kraft, Canton, and Richard C. St. John, North Canton, both of Ohio, assignors to Aspro, Inc., Canton, Ohio

Filed Aug. 4, 1975, Ser. No. 601,346

Int. Cl.² B21D *39/00*; **B23P** *11/00*

U.S. Cl. 29—509 **12 Claims**



1. The method of making a clutch housing and bearing assembly including the steps of

a. assembling side by side bearing means and a flat sheet metal disc having a central hole formed therein;

b. clamping the assembled bearing means and disc at a central portion of the disc around the disc hole between relatively axially movable and rotatable headstock and tailstock die means;

c. rotating the die means, and the disc and bearing means clamped by the die means;

d. pressure rolling, forming and ironing rotating annular disc metal portions surrounding the clamped central portion against portions of the bearing means to form a bearing housing which at least partially surrounds the bearing means, and to form retaining means which secures the bearing means within the bearing housing;

e. continuing the pressure rolling, forming and ironing of the rotating annular disc portions beyond the bearing housing against flange forming means provided on the headstock die means to form a cup-shaped clutch housing having an annular clutch shoe engaging flange terminating in an open end; and

f. then while continuing rotation of the die means, trimming the open end of said clutch housing flange to a predetermined length.

4,016,643

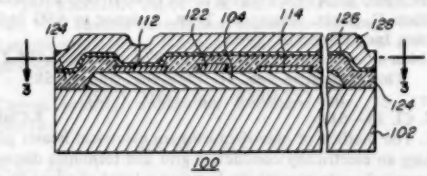
OVERLAY METALLIZATION FIELD EFFECT TRANSISTOR

Robert A. Pucel, Needham, and James A. Benjamin, Boxford, both of Mass., assignors to Raytheon Company, Lexington, Mass.

Division of Ser. No. 518,692, Oct. 29, 1974, abandoned. This application Apr. 12, 1976, Ser. No. 676,033

Int. Cl.² B01J *17/00*

U.S. Cl. 29—571 **4 Claims**



1. The method comprising the steps of:

providing a substrate of semiconductor material;

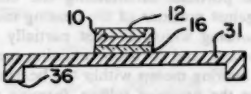
growing an epitaxial layer on said substrate;
covering said epitaxial layer with a first insulating layer;
removing portions of said first insulating layer from said epitaxial layer in first and second predetermined patterns;
depositing first and second metal layers in said first and second predetermined patterns;
covering said first and second metal layers and said first insulating layers with a second insulating layer;
removing portions of said second insulating layer and said first insulating layer from regions interspersed between portions of said first and second metal layers;
depositing a third metal layer upon said epitaxial layer in said interspersed regions; to form Schottky barrier contacts
removing the remaining portions of said first and second insulating layers;
covering portions of said first, second, and third metal layers with a third insulating layer;
removing portions of said third insulating layer above a predetermined one of said first, second and third metal layers; and
depositing a fourth metal layer, said fourth metal layer being patterned to interconnect portions of said predetermined one of said first, second, and third metal layers.

4,016,644

METHODS OF FABRICATING LOW PRESSURE SILICON TRANSDUCERS

Anthony D. Kurtz, Englewood, N.J., assignor to Kulite Semiconductor Products, Inc., Ridgefield, N.J.

Division of Ser. No. 451,860, March 18, 1974, abandoned. This application Jan. 14, 1976, Ser. No. 648,957
Int. Cl.² B01J *17/00*
U.S. Cl. 29—583 **10 Claims**



1. The method of fabricating a transducer comprising the steps of:
a. diffusing a plurality of piezoresistive patterns on a surface of a single n-type silicon wafer,
b. bonding a thin glass sheet to the surface of said wafer opposite to that surface upon which said patterns are diffused,
c. separating each of said patterns to form a plurality of individual patterns, and
d. glass bonding each individual pattern on a separate diaphragm of silicon, of non-critical electrical properties as compared to said n-type wafer to form a plurality of separate diaphragm transducer structures, whereby said portion of said glass sheet on said individual pattern is bonded to said separate diaphragm of silicon.

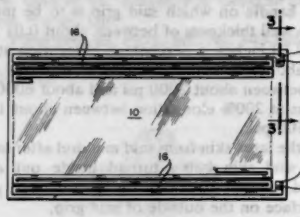
4,016,645

ELECTRIC HEATER PLATE AND TERMINAL THEREOF

William C. Cooke, Kingsport, Tenn., assignor to ASG Industries, Inc., Kingsport, Tenn.

Division of Ser. No. 466,466, May 2, 1974, Pat. No. 3,895,218. This application Feb. 21, 1975, Ser. No. 551,589
Int. Cl.² H05B *3/00*; H01C *17/28*
U.S. Cl. 29—611 **3 Claims**

1. The method of manufacturing an electrical heater plate having an electrically conductive grid and terminals disposed in terminal areas comprising bonding a layer of silver to one surface of a sheet of tempered glass, said silver extending only over the terminal areas of the glass sheet, coating the one surface of said sheet including all of said terminal areas with a metal coating, applying an enamel resist to said coating in the pattern of an electrical grid including said terminal areas, while providing an opening through said enamel resist at the location of each of said terminal areas exposing part of the



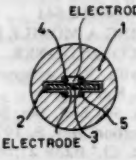
metal coating therebeneath, and removing said metal coating in all areas not covered by said resist including the metal coating exposed by said openings at said terminal areas whereby to expose the silver through the metal coating.

4,016,646

METHOD OF MAKING A RESISTOR

Franz Lucien Ghislain Pirotte, Brussels, Belgium, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Nov. 20, 1975, Ser. No. 633,577
Claims priority, application Netherlands, Dec. 16, 1974, 7416327
Int. Cl.² H01C *17/02*
U.S. Cl. 29—613 **6 Claims**



1. A method of manufacturing an electrical resistor comprising the steps of
providing a body of resistance material having electrodes;
providing leads having ends clamped against said electrodes;
enveloping said body together with said ends of said leads with a formed mass of electrically non-conducting material which shrinks during sintering; and sintering said mass.

4,016,647

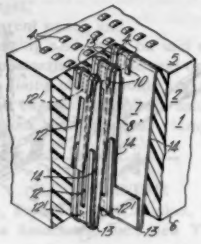
METHOD OF FORMING A MATRIX CONNECTOR

Hermanus Petrus Johannes Gilissen, Vlijmen, Netherlands, assignor to AMP Incorporated, Harrisburg, Pa.

Division of Ser. No. 490,621, July 22, 1974, Pat. No. 3,934,959. This application Oct. 3, 1975, Ser. No. 619,553
Int. Cl.² H02G *15/00*
U.S. Cl. 29—629 **3 Claims**

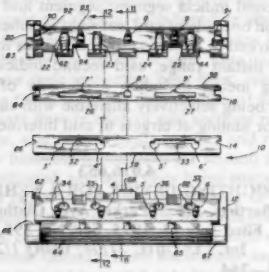
1. A method of forming a matrix connector of the type having an insulating elastomer body with opposing surfaces containing a multiplicity of spaced contacts wherein opposing contacts are interconnected by conductors extending through the body, said method comprising the steps of:
a. forming a series of spaced apertures across the width of a length of insulating lamina at spaced longitudinal intervals;
b. providing sets of discontinuous conductive strips at spaced longitudinal intervals along either side of the lamina with portions of sets on opposite sides overlapping and spanning the apertures;

c. electrically interconnecting the overlapped sets of conductive strips through the apertures;
d. folding the lamina in concertina fashion so that each set of conductive strips extend externally around a fold and each electrically interconnected sets extending around opposing folds;



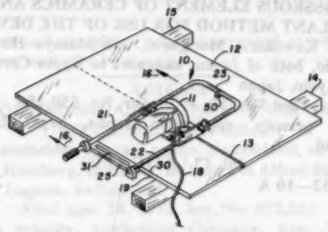
e. providing partially cured elastomer material around each limb of the concertina form; and
f. compressing the concertina form longitudinally to effect extrusion of the elastomer into the troughs of the concertina form and curing the elastomer to a homogeneous mass.

4,016,648
SAFETY RAZOR
Evan Nai-keung Chen, and Edward A. Beddall, both of Fairfield, Conn., assignors to Warner-Lambert Company, Morris Plains, N.J.
Filed Aug. 13, 1975, Ser. No. 604,505
Int. Cl.² B26B *21/06*
U.S. Cl. 30—47 **6 Claims**



1. A safety razor comprising:
a. a plastic blade seat member including a transversely elongated guard surface, a platform and a first plurality of integral support posts having lands thereon and extending from said platform;
b. a first razor blade on said blade seat platform member, said first blade including a cutting edge spaced upwardly and rearwardly of said guard surface, and a plurality of perforations formed therethrough, said first plurality of support posts extending through the perforations in said first blade;
c. a second razor blade in abutting engagement with said lands of said first plurality of support posts, said second blade including a cutting edge spaced upwardly and rearwardly of the cutting edge of said first blade, and a plurality of perforations formed therethrough;
d. a plastic cap member on said second blade, said cap member including a surface for supporting said second blade, a second plurality of integral support posts having lands thereon extending from said support surface through the perforations in said second blade, said cap post lands in abutting engagment with the top surface of said first blade; and
e. means interconnecting said cap and blade seat members for permanently bonding said first and second blades between said cap post lands and blade seat platform and said blade seat post lands and said cap support surface respectively.

4,016,649
CIRCULAR SAW GUIDE
James R. Kloster, Edina, Minn., assignor to Kloster Pattern Company, Minneapolis, Minn.
Filed June 11, 1976, Ser. No. 695,012
Int. Cl.² B27B *9/04*
U.S. Cl. 30—373 **7 Claims**



1. Guide frame means for portable powered hand saws and including:
a. retainer means comprising a generally U shaped frame member having a pair of opposed lateral edges in a first cross-member extending between said legs and disposed at one end thereof;
b. edge guide means comprising a second cross-member extending between said legs and disposed in opposed relationship to said first cross-member and having an inwardly facing edge with an inwardly extending flange overlying said inwardly facing edge, with said inwardly extending flange having a work support surface on the underside thereof;
c. saw cradle means mounted for adjustable position along said lateral legs and having portable powered hand saw clamping means on the upper surface thereof, and having a saw receiving bore formed therethrough for accommodating a saw blade therein; and
d. support means mounted upon said first cross-member and having a work engaging surface supporting said guide frame means at an elevation substantially along a plane through said work supporting surface of said inwardly extending flange.

4,016,650
IMPRESSION TRAY FOR DENTAL PURPOSES
Bernd W. Leusner, Leverkusen, and Hans-Hermann Schulz, Leichlingen, both of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany
Filed Oct. 31, 1975, Ser. No. 628,460
Claims priority, application Germany, Nov. 15, 1974, 2454216
Int. Cl.² A61C *9/00*
U.S. Cl. 32—17 **7 Claims**

1. An impression tray for dental purposes which comprises a lower-jaw tray and an upper-jaw tray each having a shape adapted to the shape of the jaw, one of the jaw-trays being

provided with a bite surface having depressions and the other jaw tray being provided with a bite surface having openings,

the openings and depressions being situated in such locations that they are in register when the two jaw-trays meet.

4,016,651

DEVICE FOR IMPLANTING AN ARTIFICIAL ENDOSSEOUS ELEMENT OF CERAMICS AND AN IMPLANT METHOD FOR USE OF THE DEVICE

Haruyuki Kawahara, Moriguchi, and Masaya Hirabayashi, Yokaichi, both of Japan, assignors to Kyoto Ceramic Co., Ltd., Kyoto, Japan

Filed Feb. 18, 1975, Ser. No. 550,186

Claims priority, application Japan, Sept. 25, 1974, 49-110730

Int. Cl.² A61C *13/00*

U.S. Cl. 32—10 A **22 Claims**

1. A device for implanting an artificial endosseous element containing:

an implant screw pin, said pin being of a radio opaque ceramic and having an external threading, said pin including a portion to be threaded into a bone structure and a protruded portion to be protruded from the upper surface of said bone structure when said pin is threaded into the bone structure, said pin being provided with a tool-attaching portion at the top of said protrusion, and

a nut element made of ceramic, said nut element being substantially larger in diameter than said pin, said nut element being threaded onto said protruded portion of said pin until the underside of said nut element engages with the upper surface of said bone structure thereby tightly holding said pin in said bone structure.

4,016,652

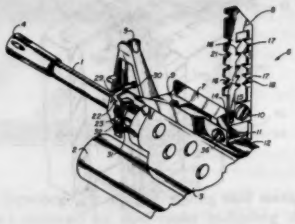
BI-AXIAL LEAF SIGHT

Urban Frederick Stratman, Taylor Ridge, Ill., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Nov. 24, 1975, Ser. No. 634,673

Int. Cl.² F41G *1/06, 1/10, 1/48*

U.S. Cl. 33—254 **3 Claims**



1. A sighting system for hand held launchers of low velocity grenades including:

a first front vertically extending sight post member in substantive alignment with the longitudinal axis of the base of the launcher,

a second front sight post member laterally offset from the first sight post member, said first and second front sight posts being vertically offset a predetermined distance, and

a rear leaf sight member of predetermined height having pre-calibrated range indicia and corresponding sighting means thereon, said range indicia and sighting means being separated into two vertically oriented segments laterally displaced from each other, the first indicia segment and sighting means being substantially centrally and vertically located and including a plurality of sight defining means for selective alignment with the first sight post member for aiming at near to intermediate range targets, the second indicia segment segment and sighting means being on one side of said leaf sight member pre-calibrated and marked to indicate target distances in the intermediate to distant range, said second indicia segment and sighting means including a plurality of sight defining means being selectively alignable with said second front sight for aiming at targets in said intermediate to distant range.

4,016,653

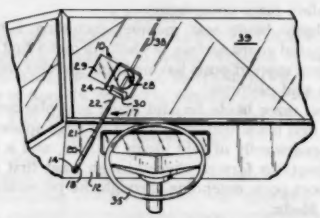
SIGHTING DEVICE FOR A VEHICLE

Joseph E. Bartlett, 215 S. Parker Ave., Olathe, Kans. 66601

Filed July 11, 1975, Ser. No. 595,327

Int. Cl.² G01C *21/04*; B60Q *1/26*

U.S. Cl. 33—264 **1 Claim**



1. A sighting device for installation in the driver's compartment of a vehicle to assist in the driving of the vehicle, said sighting device comprising:

an elongate, adjustable arm member having an inner end being adapted for connection to a support within the driver's compartment of the vehicle to mount said arm member therein, said arm member being adjustable to vary the horizontal and vertical position of its outer end;

a sight member mounted on said outer end of the arm member, said sight member presenting an opening therein for alignment with a reference target located remotely of the vehicle to permit said reference target to be sighted through said opening, thereby providing an indication of the position of the vehicle relative to said reference target;

a tinted transparent panel; and

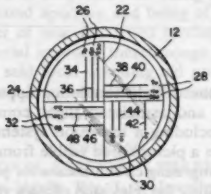
means for mounting said panel on said sight member at a position to substantially overlie said opening, said means comprising a clamp plate mounted on said sight member and having an edge biased toward said sight member to retain said panel between said clamp plate and sight member.

4,016,654

RANGE FINDER

Patrick Tepedino, Port Jefferson Station, N.Y., assignor to Lawrence Peska Associates, Inc., New York, N.Y., a part interest

Filed Jan. 26, 1976, Ser. No. 652,208
Int. Cl.² G01C *3/24*
U.S. Cl. 33—277 **2 Claims**



1. A range finder comprising a tube having an eye end and an object end, both ends of said tube being open for visual sighting therethrough, sight means mounted in the object end of said tube, said sight means comprising a plurality of base lines transverse to the longitudinal axis of said tube a fixed distance from said eye opeing, each base line also intersecting one another, thereby dividing said sight means into sections, each section having a plurality of sight lines parallel to and extending above their respective base lines, readable indicia for designating the range of an object adjacent said sight lines each of said sight lines in each of said sections representing a different range, said indicia being parallel and readable with respect to the base line subtending the section in which said indicia are positioned, said sight lines being spaced above said base line by a factor comprising the tangent of an object of known dimension being sighted and the distance of such object to said eye opening, each sight line in each section being spaced a different distance from each other and from their respective base lines said parallel sight lines being arranged in each section so that said sight lines indicating relatively short distances are mixed with the sight line indicating longer distances to thereby avoid crowding of said sight lines and confusion of said indicia adjacent said sight lines, said tube being rotatable on its longitudinal axis for aligning the sight lines and indicia of each section with a distant object so that said object may be sighted through one base line and sight line and the indicia adjacent such sight line read.

4,016,655

BORING RIG ALIGNMENT APPARATUS AND METHOD

Morgan LeVon Crow, Dallas, Tex., assignor to Dresser Industries, Inc., Dallas, Tex.

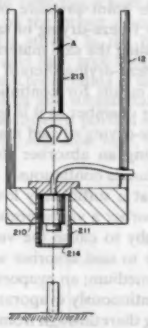
Filed July 30, 1975, Ser. No. 600,324
Int. Cl.² G01C *15/00*
U.S. Cl. 33—286 **8 Claims**

1. Apparatus for providing optical alignment of a boring rig over a survey point, comprising:

housing means containing camera means arranged for sighting along a line coinciding with the drilling axis of a boring rig;

pivotable suspension means connecting said camera means to said housing means and selectively adapted to allow said camera to swing freely; and,

target plate means secured to the lower side of said housing



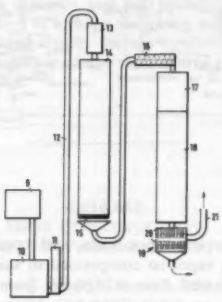
means and containing a target arranged to intersect the drilling axis of a boring rig.

4,016,656

METHOD AND ARRANGEMENT FOR THE NATURAL VITAMINIZING OF GRAIN

Alfred Batscheider, Porza, Lugano, Switzerland, and Jiri Bernasek, Hamburg, Germany, assignors to Alfred Batscheider, Porza, Lugano, Switzerland

Filed Apr. 28, 1975, Ser. No. 572,254
Claims priority, application Germany, Apr. 30, 1974, 2420910
Int. Cl.² F26B *7/00*
U.S. Cl. 34—12 **35 Claims**



1. A method for the natural vitaminizing of grain, comprising holding said grain in the temperature range of about 25° to 35° C for a period of about 5 to 30 hours while maintaining the moisture content of said grain in the moisture content range of about 18 to 24 percent by weight; and thereafter drying said grain to a moisture content of about 14 to 16 percent by weight.

4,016,657

HEAT PUMP FREEZE DRYING SYSTEM

Arjun Dev Passey, now by change of name Chand Arjun Passey, 3760 Gottingen St., Apartment B-201, Halifax, N. S., Canada (B3K 5K5)

Division of Ser. No. 162,607, July 14, 1971, abandoned. This application Oct. 4, 1973, Ser. No. 403,437
Int. Cl.² F26B *13/30*
U.S. Cl. 34—92 **47 Claims**

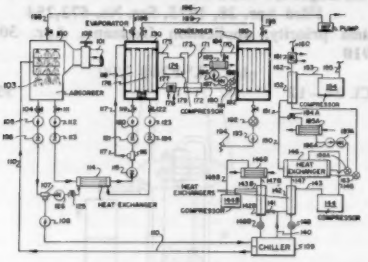
1. A freeze-drying system for freeze-drying a material, said material comprising a substance to be removed to effect freeze-drying of said material, which system substantially eliminates need to supply heat from an external heat source

for freeze-drying said material; said system comprising in combination:

a. a drying chamber wherein is maintained a vapor pressure below the triple point pressure of substance to be removed to effect freeze-drying of said material;

b. a means for passing the said material through said drying chamber for freeze-drying thereof during said passage;

c. an evacuation means for continuously removing vapor from said drying chamber as it is generated in said chamber in the freeze-drying of said material, said evacuation means comprising an absorber through which a liquid absorbent medium is continuously passed, said absorbent medium being at a sufficiently low temperature to provide in said absorber a vapor pressure lower than in said chamber whereby to cause the vapor to pass from said drying chamber to said absorber where it is absorbed in said absorbent medium; an evaporator in which absorbed substance is continuously evaporated from the absorbent medium passing therethrough from said absorber at a rate similar to that at which said vapor is absorbed in said absorbent medium in said absorber, by heat exchange with condensing first refrigerant; a condenser in which vapor from said evaporator is condensed by heat exchange with evaporating first refrigerant; a first heat pump means adapted to compress at least a portion of



first refrigerant vapor from said condenser, pass first refrigerant vapor so compressed to said evaporator and pass condensed first refrigerant from said evaporator through an expansion valve to said condenser, said first heat pump means including a cooling means for removing excess heat from said first refrigerant to maintain heat balance in said evaporator and in said condenser; a chiller in which the absorbent medium from said evaporator is cooled to restore the absorbent medium to the proper temperature for said absorber for passage to said absorber, by heat exchange with evaporating second refrigerant; and a means to maintain the absorbent medium in circulation between said absorber, evaporator, and chiller; and a means to purge the noncondensible gases from the system;

d. a second heat pump means adapted to compress at least a portion of second refrigerant vapor from said chiller, pass the second refrigerant vapor so compressed to a heat exchange means for supplying heat to effect freeze-drying of said material in said drying chamber and pass condensed second refrigerant from heat exchange means through an expansion valve to said chiller, said second heat pump means including a cooling means for removing excess heat from said second refrigerant to maintain heat balance in said heat exchange means and in said chiller.

4,016,658

VIDEO GROUND-BASED FLIGHT SIMULATION APPARATUS

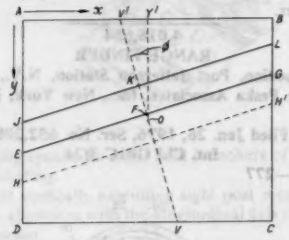
Arthur Paul Porter, Haywards Heath; James William Morris, Lewes, and Roy Alfred George Gasson, Crawley, all of England, assignors to Redifon Limited, England

Continuation of Ser. No. 239,192, March 29, 1972, abandoned. This application Dec. 24, 1974, Ser. No. 536,242

Claims priority, application United Kingdom, Apr. 2, 1971, 8509/71

Int. Cl.² G09B *9/08*

U.S. Cl. 35—12 N **5 Claims**



1. In ground-based flight simulation apparatus including a dummy cockpit and associated flight computer and visual display means including a television system for producing a scanned image in a picture area visible from said cockpit, the improvement comprising circuit means for providing a control signal for controlling the television picture visibility during the line and frame scanning of said image so as to produce first, second, third and fourth boundaries spaced apart within the picture area of said scanned image and to thereby define first, second, third, fourth, and fifth visibility zones, controlled-gain signal amplifier means for providing a full-visibility visual image in the picture area of the third zone defined between the second boundary and third boundary, zero-visibility visual images in the picture areas of the first and fifth zones lying outside of said first boundary and outside of said fourth boundary, respectively, and progressively reduced visibility visual images in the picture areas of the second and fourth zones extending from said second boundary to said first boundary, and from said third boundary to said fourth boundary, respectively, and circuit means controlled from the flight computer for rotating all of said boundaries about the center of the picture area in accordance with computed aircraft roll and for displacing said first and second boundaries and said third and fourth boundaries in accordance with computed aircraft pitch and height, so as to vary the separation between said first boundary and said second boundary and the separation between said third boundary and said fourth boundary and thus adjust the widths of said second and fourth zones of progressively reduced visibility visual images.

4,016,659

FOCAL SCANNING AID

Denis F. Merrigan, 1467 Kathleen St., Newbury Park, Calif. 91320

Filed Dec. 29, 1975, Ser. No. 644,711

Int. Cl.² G09B *17/04*

U.S. Cl. 35—35 B **2 Claims**

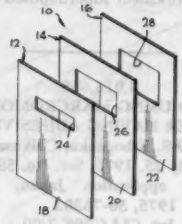
1. A focal scanning aid comprising:

a set of first, second and third mats, each of said mats being of sufficient size to cover at least a portion of a printed page, each of said mats being of substantially rectangular shape and having a substantially black matte surface thereon;

first, second and third rectangular apertures respectively in said first, second and third mats, said first, second and third apertures each having substantially the same width

which is sufficient to expose a full column width of printed material;

said first aperture in said first mat being of such height that an unskilled reader can scan three lines of printed material exposed therethrough in a single scan pass, said second aperture in said second mat having a greater height so that a more skilled reader can scan six lines of printed



material exposed therethrough in a single pass, and said third aperture in said third mat being of greater height than said second aperture and being of such height that only a reader of near maximum reading skills can scan printed material exposed therethrough in a single scan pass so that said focal scanning aid progressively trains readers to scan larger quantities of material.

4,016,660

EDUCATIONAL SYSTEM ALPHABET CARDS

Barbara Salvatore Ingalls, Rte. 1, Walworth, Wis. 53184

Filed Aug. 1, 1975, Ser. No. 601,200
Int. Cl.² G09B 11/04
U.S. Cl. 35—71 **4 Claims**

1. In an educational system, a set of cards each having on its face a letter of the alphabet in cursive form at a distinctive level different than said face and having a printed form of the same letter disposed in coinciding relation to a portion of said cursive form with the connectors, smoothers and decorations of the cursive form when present at a level distinctively different from said printed form.

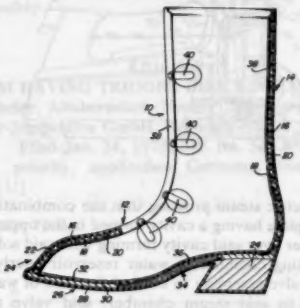
4,016,661

WESTERN-TYPE BOOT PAC WITH INSULATED WATERPROOF CONSTRUCTION

Allen Ben Tibbitts, Box 162, Teton, Idaho 83451

Filed Nov. 5, 1975, Ser. No. 629,619
Int. Cl.² A43B 1/10
U.S. Cl. 36—4 **2 Claims**

1. An article of footwear for use by a wearer engaged in outdoor activities during inclement or very cold weather conditions and requiring periods of horseback riding in which the wearer must place his feet in saddle stirrups and exert downward pressure on the stirrups in the arch area of each foot in order to maintain his position in the saddle, said article of footwear including a foot enclosing portion and a leg enclosing portion for enclosing the foot and the lower portion of the leg of the wearer, said foot enclosing portion including a riding toe of tapering and pointed construction simulative of a western style riding toe to facilitate insertion of the foot enclosing portion into a stirrup and to facilitate removal therefrom without accidental entanglement, a sole extending rearwardly from the riding toe and including a high arch supporting area immediately in front of the breast of a high riding heel to facilitate retention of a stirrup in the high arch supporting area, a rigid shank in said high arch supporting area with the forward end of the shank terminating at the forward end of the high arch supporting area and substantially rearwardly of the riding toe whereby the forward portion of the foot enclosing portion remains flexible, said sole, heel, high arch supporting



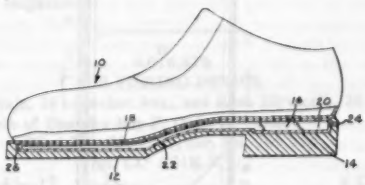
area, riding toe and the remainder of the foot enclosing portion and the leg enclosing portion including an outer layer of flexible, resilient, waterproof material of unitary construction and an inner layer of fabric material, said leg enclosing portion and the portion of the foot enclosing portion above the sole including an intermediate layer of flexible, resilient, foam cellular insulating material, said sole including an intermediate layer in the form of a shape sustaining midsole having the rigid shank mounted fixedly therein to distribute forces exerted on the stirrup over a large surface area of the bottom of the foot of a wearer.

4,016,662

SHOE CONSTRUCTION

Charles Thompson, 745 Pennsylvania Ave., Brooklyn, N.Y. 11207

Filed Aug. 3, 1976, Ser. No. 711,241
Int. Cl.² A43B 13/20
U.S. Cl. 36—29 **7 Claims**

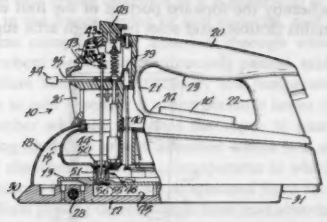


1. A shoe construction comprising an upper portion attached to an innersole, an outer sole and a heel beneath said innersole or wall located between said soles and between said innersole and said heel about the peripheries thereof defining an enclosed cavity between said soles and between said innersole and said heel, a hollow flexible sack located with said cavity, a pressurized fluid within said sack, at least two separated areas of said inner sole being fixedly secured to adjacent abutting areas of said sack, the remaining areas of said inner sole being disposed unfastened to said sack.

4,016,663
ELECTRIC PRESSING IRON

Melvin N. Cline, Orange, Calif.; Robert John Augustine, Downers Grove, and Donald John Westphal, South Elgin, both of Ill., assignors to Sunbeam Corporation, Chicago, Ill.

Filed May 21, 1976, Ser. No. 688,858
Int. Cl.² D06F 75/06
U.S. Cl. 38—77.83 5 Claims

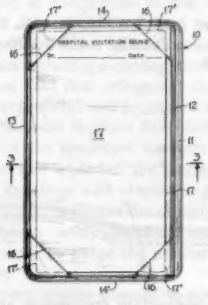


1. In an electric steam pressing iron the combination comprising a sole plate having a cavity formed in the upper surface thereof, a cover over said cavity forming with said sole plate a steam generating chamber, a water reservoir overlying said sole plate, a valve assembly to control the flow of water from the reservoir to said steam chamber, said valve assembly engaged with the bottom of said reservoir and having a base secured to said cover, a valve seat threadably received in said base to retain said reservoir with respect to said base, a movable valve member to control water flow, said valve seat having a passageway extending therethrough with an intermediate shouldered portion against which said valve member abuts to prevent water flow, a portion of said passageway extending from said shouldered portion to said steam chamber being of reduced diameter, said reduced diameter being formed in part by an annular synthetic jewel.

4,016,664
POCKET HOLDER FOR INTERCHANGEABLE WORKSHEETS

Arthur E. Kaufmann, Summit, N.J., assignor to William F. Blake, Inc., Summit, N.J.

Filed Apr. 22, 1976, Ser. No. 679,239
Int. Cl.² A45C 11/04; G09F 3/20
U.S. Cl. 40—10 R 8 Claims

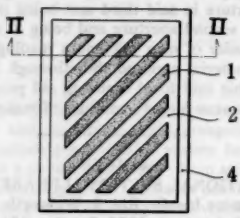


1. A holder for interchangeable worksheets comprising a generally rectangular backing member which is relatively stiff but has a degree of planar flexibility, a generally rectangular worksheet mounting member having the same length and slightly narrower width than said backing member, said mounting and backing members being secured together along one long side and opposed short sides thereof to provide a pocket therebetween, said holder has dimensions of about 3¾ inches × 6¼ inches thereby adapting the same to freely fit conventional shirt breast pockets as well as inner jacket pockets, the outer surface of said backing member having a roughened, suede-like surface, to thereby prevent accidental displacement of said holder from said shirt or jacket pockets, and said mounting member having diagonal cut-outs adjacent the four corners thereof facilitating insertion of the corners of a worksheet beneath said mounting member and support of the remainder of said worksheet superimposed on said mounting member.

4,016,665
SIGNBOARD USING MARCROMOLECULAR ELASTOMER HAVING ADHESIVE LAYER

Mitsushi Sakota, 4-9-8, Kibogaoka, Chikusa, Nagoya, Japan

Filed July 25, 1975, Ser. No. 599,172
Claims priority, application Japan, July 31, 1974, 49-88384; June 21, 1975, 50-76302
Int. Cl.² G09F 7/00
U.S. Cl. 40—135 14 Claims

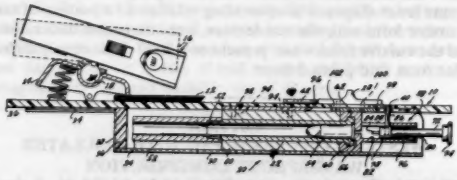


1. A signboard which can be applied to substantially any type of surface which comprises a flexible antiweathering macromolecular sheet composed of rubber or synthetic resin, a colored paint coated on the front surface of said sheet to form a design or message and a self-sticking adhesive on the back surface of said sheet composed principally of a mixture of rubber and asphalt.

4,016,666
CLIPBOARD INCORPORATING WEAPON

Charles A. Finn, 2808 Todd, and Albert Duckworth, 712 1/2 S. Pacific, both of Oceanside, Calif. 92054

Filed May 6, 1976, Ser. No. 683,887
Int. Cl.² F41C 9/00; F41H 1/00
U.S. Cl. 42—1 J 17 Claims



1. The improvement in a clipboard for purposes of defense, comprising:

a. said clipboard including a flat sheet and means to secure papers on the upper face thereof,

b. a weapon secured to said clipboard, said weapon having a barrel and being adapted when actuated to project a disabling agency out of a first end of said barrel, said first end of said barrel being directed toward a first end of said clipboard whereby when said clipboard first end is directed toward a person said barrel first end is also directed toward that person, and

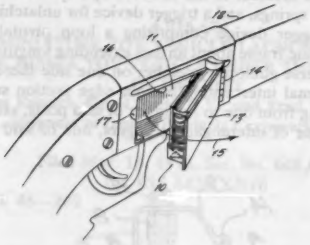
c. said weapon having a trigger for firing said weapon in position to be actuated by one holding said clipboard.

4,016,667

SIDE SPRING DOOR ACTION

John P. Forbes, Box 355, Newport, N.H. 03773

Filed Mar. 31, 1976, Ser. No. 672,411
Int. Cl.[2] F41C 25/00
U.S. Cl. 42—6 2 Claims



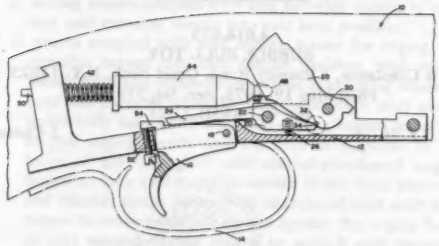
1. A side spring door action for a firearm, comprising in combination, a magazine behind a barrel of a firearm, a sideward opening to said magazine, said opening being closeable by means of a sidewardly pivotable door about a hinge, an inner side of said door carrying an action, said action including a clip supported within a frame secured to a rear side of said door, said clip including a pair of compression coil springs bearing against an underside of a plate upon which projectiles of a firearm are loaded by moving said plate against said compression coil springs.

4,016,668

FIRING MECHANISM FOR FIREARM

Gerald Joseph Frazier, Melrose, Mass., assignor to Frazier Gun Co., Melrose, Mass.

Filed Jan. 15, 1976, Ser. No. 649,412
Int. Cl.[2] F41C 19/00
U.S. Cl. 42—69 R 4 Claims



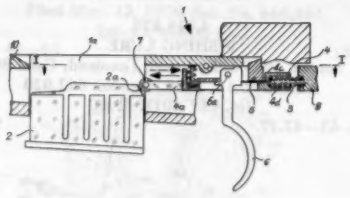
1. A firing mechanism for a gun comprising; a base; a firing hammer mounted on said base to move from beyond a cocked position to a firing position at which the hammer strikes a firing pin; a cam-receiving socket in said hammer; firing spring and cam means having moving contacting surfaces and a rounded driving end mounted between said base and said hammer such that said rounded driving end engages said cam-receiving socket in ball and socket relation for urging said hammer from said cocked position toward said firing position; a sear-receiving notch in said hammer having a sear-bearing wall terminating in a sear-bearing corner; a sear mounted on said base having a hammer-bearing surface terminating in a hammer-bearing corner complementarily to the bearing portions of the sear receiving notch; said sear mounted on said base with said hammer-bearing surface and said sear-bearing corner in contact with each other when the firing mechanism is in the cocked position and said hammer-bearing surface presenting an acute angle in relation to its path of motion whereby the force of said firing spring on said hammer, at least in part, holds said sear in the cocked position; sear spring means for urging said hammer-bearing corner of said sear into said sear receiving notch; trigger means for moving said sear to release said sear from said notch to fire said gun; said hammer-bearing corner spaced from said sear-bearing corner by a dimension substantially equal to the distance the sear-bearing corner travels, when the trigger is pulled prior to substantially completely encountering the frictional resistance of the moving contacting surfaces of said firing spring and cam means; whereby firing said gun is accomplished with reduced force and trigger motion without impairment of safety.

4,016,669

FIREARM HAVING TRIGGER BLOCKING MECHANISM

Rolf Gminder, Altoberndorf (Neckar), Germany, assignor to Mauser-Jagdwaffen GmbH, Germany

Filed Jan. 24, 1975, Ser. No. 543,891
Claims priority, application Germany, Jan. 30, 1974, 7403023[U]
Int. Cl.[2] F41C 17/08
U.S. Cl. 42—70 A 5 Claims



1. A firearm, comprising a housing, a gun barrel mounted on said housing, a magazine opening in said housing adjacent said gun barrel, a trigger pivotally mounted on said housing adjacent said magazine opening, a slider movable on said housing adjacent the magazine opening and said trigger and having a magazine contact portion positionable in the magazine opening and a trigger blocking portion positionable at a location to block the movement of the trigger when said magazine contact portion is in the magazine opening, said slider being displaceable upon insertion of a magazine into the opening to contact said magazine contact portion to shift said contact portion and said slider out of the opening and to position said trigger blocking portion in a position away from said trigger, so that said trigger can be moved, and biasing means for biasing said slider in a direction toward the magazine opening, said magazine contact portion including two spaced apart arms having a roller therebetween engageable with the magazine.

4,016,670

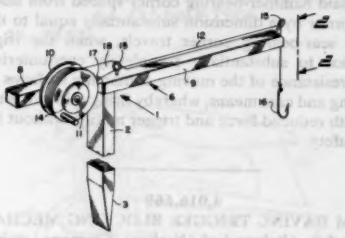
ICE FISHING DEVICE

Eino Pihlaja, 101 Machar Ave., and Risto Hirvasoja, 20 Peter St., both of Thunder Bay P, Ontario, Canada

Filed July 29, 1976, Ser. No. 709,794
Int. Cl.[2] A01K 97/12
U.S. Cl. 43—17 4 Claims

1. An ice fishing device comprising a generally vertical mast member adapted to have its lower end portion anchored in a mound of packed wet snow or ice adjacent to an ice fishing hole; a rod and reel member having an elongated rod portion with a line guide at its end and having a handle portion on which a reel is rotatably supported for drawing in or letting out a fish line wound around said reel through said line guide and longitudinally along said rod portion; and hinge means pivotally connecting the upper end of said mast member to said rod and reel member in spaced relation to the center of gravity of the latter so that the latter assumes, by gravity, a normal

fishing position whereat said line guide is spaced above the ice fishing hole and so that a downward pull on the fish line extending downwardly from said line guide by a fish striking or hooked by a baited fishhook at the lower end of said fish line



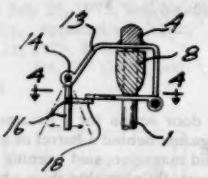
will swing the rod and reel member about said hinge means to signal the fisherman to reel the fish in; said handle portion being laterally offset from said rod portion; and said reel being supported on said handle portion in alignment with said rod portion.

4,016,671
FISHING LURE
Paul F. Larsen, 1025 Sitka Court, Loveland, Colo. 80537
Filed Dec. 18, 1975, Ser. No. 642,020
Int. Cl.² A01K *85/00*
U.S. Cl. 43—42.17 **9 Claims**

1. A fishing lure comprising:
an elongated shaft;
connecting means defined at one end of said shaft for securing a fish hook;
coupling means defined at the other end of said shaft for securing a line;
bearing means on said shaft between said connecting and coupling means;
and a generally spoon-shaped blade having an aperture located near the head end portion thereof and in which said shaft is received to position said blade between said bearing means and said coupling means with a cavity of said spoon facing said shaft, said head end portion being scooped shaped, in reverse of the generally spoon shape of said blade, to cause the tail end portion of said blade to tilt outwardly from said shaft when said lure is drawn relatively through water, the forwardmost marginal portion of said head end portion being bent away from said shaft, and the shape of said blade including means causing the blade to revolve about said shaft when said lure is so drawn.

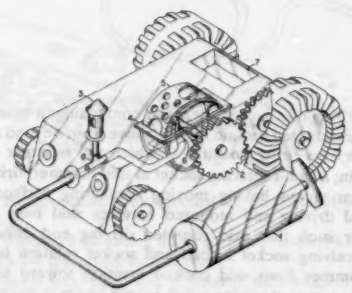
4,016,672
GUILLOTINE TYPE ANIMAL TRAP
Armand Joncas, P.P. Dequen, St. Francois de Salle, County of Roberval, Quebec, Canada (G0W 1M0)
Filed Jan. 30, 1976, Ser. No. 653,651
Claims priority, application Canada, Feb. 7, 1975, 219578
Int. Cl.² A01M *23/30*
U.S. Cl. 43—78 **4 Claims**

1. An animal trap comprising a frame including a pair of posts arranged in laterally spaced-apart relationship to form a gate for an animal, a transverse guillotine member slidable along said posts for movement between an elevated open position and a fallen closed position, a pair of springs connected to the opposite ends of said transverse guillotine member on opposite sides of said gate and biasing said transverse guillotine member towards the fallen closed position thereof, a latch secured to the frame and arranged to hold the transverse guillotine member in the elevated open position against the bias of the springs, and a trigger device for unlatching said latch, said trigger device comprising a loop pivotally suspended from said frame about an axis extending longitudinally of said transverse guillotine member on one side thereof and having an animal intercepting bottom edge section substantially stretching from one to the other of said posts, said latch including a pair of interengaging fingers, one of said fingers



being pivoted to said frame about another axis extending parallel to said first-named axis and on the opposite side of said transverse guillotine member relative to said first-named axis, said one finger adapted to extend across the underside of said transverse guillotine member in the holding position thereof and the other of said fingers being rigidly secured to said loop at a distance spaced from the pivotal axis of said loop and engaging under said first-named finger to releasably support the latter in said holding position, said fingers forming a pair of superposed lateral projections disengageable from each other upon pivoting of said loop in either angular direction about said first-named axis, said trap further including a ratchet locking device interconnecting said guillotine member to said frame and adapted to releasably lock said guillotine member in the closed position thereof.

4,016,673
BUBBLE PULL TOY
Chris Constance, 1 Ramsey Road, Great Neck, N.Y. 11023
Filed May 19, 1975, Ser. No. 578,999
Int. Cl.² A63H *33/28*
U.S. Cl. 46—6 **3 Claims**



1. A bubble toy comprising a housing supported for movement on wheels, a cylindrically shaped thin annular wheel surface drivingly connected to one said housing wheels, said annular surface wheel comprising an annular perforated web, rotatable about a horizontal axis, said web being perforated with holes of varying size openings, said annular wheel being in contact with a bubble solution held in a bath supported on

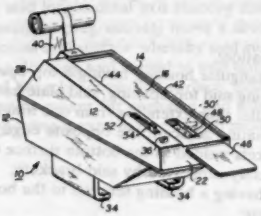
said housing, jet means on said housing and located within said wheel to supply a jet of air toward certain of said annular wheel openings in that portion of said annular wheel which has been rotated to a general horizontal position whereby said jet means causes production of a plurality of bubbles upwardly and outwardly as said annular wheel is rotated.

4,016,674

MINIATURE TOY VEHICLE LAUNCHER FOR LAUNCHING A TOY VEHICLE UNDER THE INFLUENCE OF GRAVITY

Charles Resnick, Great Neck, N.Y., and Fred Zant, Boonton, N.J., assignors to Lesney Products Corporation, Moonachie, N.J.

Filed Mar. 18, 1976, Ser. No. 668,038
Int. Cl.² A63H *18/16*
U.S. Cl. 46—202 **18 Claims**



1. A toy vehicle launcher for the launching of a toy vehicle propelled under influence of gravity, comprising:

a. platform means adapted for the support of the toy vehicle in an inclined position;

b. means movable relative to said platform means from a first position to hold the toy vehicle onto said platform means to a second position to release the toy vehicle thereby to permit it to roll off said platform means under the influence of gravity;

c. setting means coupled with said movable means to position said movable means into said hold position;

d. means coupled with said setting means for urging said movable means into said release position, said setting means including means to overcome said urging means to hold said movable means in the hold position, slide means operatively associated with said setting means including second urging means and movable in response to the force of the urging of said second-mentioned urging means to lock said movable means in the hold position, and release means operatively associated with said slide means to move said slide means against the urging force of said second urging means to unlock said movable means thereby permitting said first urging means to move said movable means to the release position.

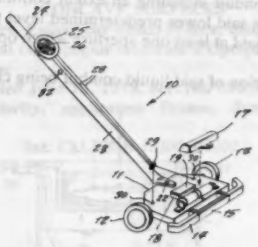
4,016,675

PUSH TOY

Howard Drucker, 35 Great Rock Road, Sherbon, Mass. 01770

Continuation-in-part of Ser. No. 535,214, Dec. 23, 1974, Pat. No. 3,940,881. This application Oct. 17, 1975, Ser. No. 623,560
Int. Cl.² A63H *17/36*
U.S. Cl. 46—205 **11 Claims**

1. A toy combination comprising a push toy and a removable toy, said push toy including a carriage, a pair of wheels rotatably mounted to said carriage, said wheels supporting said carriage, a control stick pivotally mounted to said carriage, at least a portion of said stick constituting a handle, steering means mounted to said stick and connected to said carriage, said steering means providing relative movement



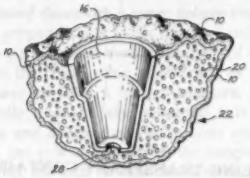
between said stick and said carriage, and means for magnetically attaching said removable toy and said push toy.

4,016,676

PLANTER AND METHOD OF MAKING SAME

Edward T. Bennick, Jr., Rte. 3, Box 683, Lincolnton, N.C. 28092

Filed Mar. 12, 1976, Ser. No. 666,465
Int. Cl.² A01G *9/02*
U.S. Cl. 47—66 **10 Claims**



1. A method of forming a planter having an earthen like exterior surface configuration, said method comprising the steps of:

a. providing a volume of earthen material;

b. forming a cavity in said volume of earthen material;

c. introducing into said cavity a filler material consisting of a quantity of liquid plastic material;

d. allowing said liquid plastic material to cure by expanding to a rigid cellular form throughout said cavity to conform to the surface configuration thereof while adhering to a thin layer of said earthen material at the wall of said cavity; and

e. forming an opening in said cured plastic material for receiving a plant.

4,016,677

AIR PULSED HYDROPONIC UNIT

Helmut Julinot, 3455 Havenwood Ave., House 30, Mississauga, Ontario, Canada

Filed May 7, 1975, Ser. No. 575,124
Int. Cl.² A01G *31/00*
U.S. Cl. 47—64 **1 Claim**

1. A hydroponic unit comprising:

a tray for holding aggregate;

at least one drainage aperture in said tray;

a reservoir for nutrient solution arranged to hold nutrient solution between a predetermined lower level and a predetermined upper level;

said upper level being below the level of aggregate in said tray;

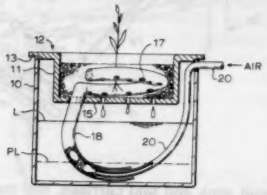
said reservoir being located to receive liquid passing downwardly through said drainage aperture;

a liquid conduit having a lower end open in the reservoir

below said lower predetermined level, and an upper end having at least one aperture opening into said tray;

said liquid conduit including an extent continuously rising from below said lower predetermined level to a location as high as said at least one aperture which opens into said tray;

the cross-section of said liquid conduit being chosen so that



air bubbles may extend across the cross-section of the tube;

an air conduit introduced into the liquid conduit through the lower open end of the liquid conduit,

said air conduit having an open end located in said liquid conduit below said lower predetermined level in a portion of said continuously rising extent whereby bubbles created by air released by the air conduit, rise in said extent.

4,016,678

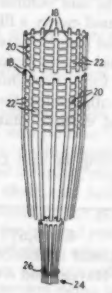
SEEDLING TRANSPLANT CONTAINERS

Ronald Leslie Larsen, Minneapolis, Minn., assignor to Conwed Corporation, St. Paul, Minn.

Continuation-in-part of Ser. No. 436,215, Jan. 24, 1974, abandoned. This application May 5, 1975, Ser. No. 574,263

Int. Cl.² A01G *9/02*

U.S. Cl. 47—77 **8 Claims**



1. A seedling transplant container comprising:

a. a plastic net cylinder having sets of spaced longitudinal and transverse strands;

b. said longitudinal and transverse strands being integrally joined together at their mutual intersections;

c. an end region of said cylinder wherein said transverse strands are omitted;

d. said end region having omitted transverse strands being at least as long as the radius of said cylinder; and

e. means which pinch together the longitudinal strands in the region having omitted transverse strands whereby at least a truncated conical shape is formed at the end of a substantially cylindrical shape.

4,016,679

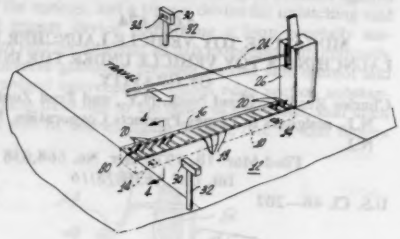
TRAFFIC CONTROL APPARATUS

Clarence L. Ellefson, deceased, late of Burbank, Calif. (by Charlotte Vivian Ellefson, executrix), assignor to Rusco Industries, Inc., Los Angeles, Calif.

Filed May 19, 1975, Ser. No. 579,030

Int. Cl.² E01F *13/00*

U.S. Cl. 49—49 **8 Claims**



1. In combination:

a hollow rectangular housing having a top opening;

a plate covering said top opening, said plate having a plurality of parallel slots extending from one longitudinal edge and terminating adjacent the opposite edge;

spaced brackets welded to the bottom surface of said plate,

a shaft rotatably supported by said brackets;

gear means having a housing secured to the bottom surface of said plate,

said gear means being operatively coupled to said shaft at one end thereof;

a bar of substantially the length of said shaft;

rigid connecting members securing said bar and said shaft in fixed spaced relation with said bar parallel to said shaft;

a plurality of sleeves slidably positioned on and rotatable on said shaft,

a respective tooth integral with each sleeve, and

a respective finger integral with each sleeve,

and a respective tension spring connected at one end to each finger,

the remaining ends of all said springs being connected to said bar.

4,016,680

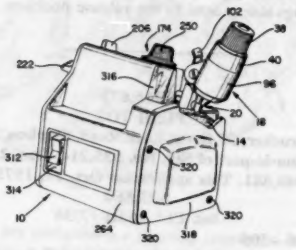
SHARPENER FOR TWIST DRILLS INCLUDING GRINDING WHEEL DRESSING MEANS

Robert Gordon Moores, Jr., Cockeysville, and Richard Eugene Walton, II, Baltimore, both of Md., assignors to The Black and Decker Manufacturing Company, Towson, Md.

Division of Ser. No. 456,946, April 1, 1974, Pat. No. 3,930,342. This application Sept. 12, 1975, Ser. No. 612,914

Int. Cl.² B24B *3/28, 53/04*

U.S. Cl. 51—5 D **16 Claims**



1. An apparatus for grinding twist drills or the like comprising:

a frame;

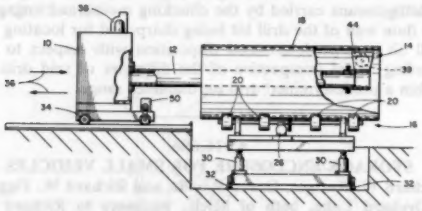
grinding wheel means supported by said frame;
holding means operable to either hold the leading end of a twist drill in contact with a surface of said grinding wheel means, or hold a dressing tool for dressing the grinding wheel means;
a pivot rod defining a longitudinal axis;
means to mount said holding means on said pivot rod;
supporting means for alternately supporting said pivot rod in:
a. a first mode wherein said pivot rod is spirally rotatable about said longitudinal axis so as to rotatingly move said pivot rod along said axis thereby causing said holding means to move in a spiral manner to progressively move the leading end of the bit laterally over the surface of said grinding wheel means whereby the wear on the surface of said grinding wheel means is minimized when the leading end of the twist drill or the like is ground on said surface; and, in a
b. second mode wherein said pivot rod is movable linearly along said longitudinal axis thereby causing said holding means to progressively move a dressing tool laterally across said surface whereby said surface is dressed when a dressing tool is held in said holding means and moved linearly across said surface; and,
mode selection means for engaging and selectively placing said supporting means in one of said modes.

4,016,681

SURFACE TREATMENT DEVICE FOR LARGE DIAMETER PIPE SECTIONS

Raymond M. Leliaert, South Bend, Ind., assignor to Wheelabrator-Frye, Inc., Mishawaka, Ind.

Filed Dec. 11, 1975, Ser. No. 639,909
Int. Cl.² B24C *3/14, 3/16*
U.S. Cl. 51—9 M **8 Claims**



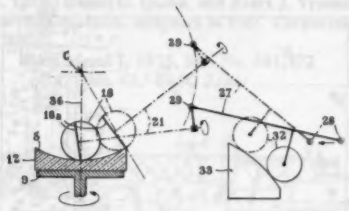
1. A device for surface treatment of the inside and outside of large diameter cylinders comprising:
a. projecting means including a centrifugal blast wheel for projecting particulate against the surface of said cylinder as it rotates, means integral with said projecting means for recovering the projected particulate and a compliant seal disposed about the opening to said projecting means to confine the particulate to the projecting means,
b. means for supporting said cylinder including
i. means for rotating said cylinder about a horizontal axis,
ii. means for moving said cylinder between a first position where said wheel will treat the outside of said cylinder and a second position where said wheel will treat the inside of said cylinder,
c. means mounting said projecting means for movement into and out of proximity with the surface of said cylinder to be treated.

4,016,682

COPYING MACHINE NOTABLY FOR GRINDING CONCAVE SURFACES

Serge Legendre, Epinay sur Seine, France, assignor to Essilor International (Compagnie Generale d'Optique), Joinville le Pont, France

Filed June 10, 1975, Ser. No. 585,561
Claims priority, application France, June 20, 1974, 74.21438
Int. Cl.² B24B *13/00, 17/02*
U.S. Cl. 51—50 PC **5 Claims**



1. A grinding machine of the copying type for making a concave surface on an article, comprising a working table, an interchangeable templet having a concave surface identical with the concave surface to be obtained, said concave surface having associated therewith a mean sphere centered to an axis substantially perpendicular to the concave surface centrally of said concave surface and having a radius of a value substantially equal to the mean value of the radii of curvature of the desired concave surface, a pair of supports for said templet and said article, respectively, mounted side by side on the working table and driven for synchronous rotation about two parallel axes, the axis of rotation of the templet support being coincident with the axis of said concave surface, a movable copying head, a feeler carried by said copying head and shaped to be able to make a pin point contact with the concave surface of the templet, a rotatably driven grinding wheel carried by said copying head, said feeler and grinding wheel having identical convex curved working surfaces each having a centre of symmetry, the two centres of symmetry defining a straight line extending at right angles to the axes of rotation of said templet and article supports, said copying head being movable between a first position in which the centres of symmetry of said feeler and grinding wheel are located on the axes of rotation of said templet and article supports respectively, and a second position in which said centres of symmetry are spaced from the axes of rotation of said templet and article supports, and guide means for imparting to said movable copying head, as it moves from said first position to said second position, a component of movement of rotation about a fixed axis passing substantially through the centre of said mean sphere of the templet concave surface, said fixed axis being parallel to said straight line defined by the two centres of symmetry of said feeler and grinding wheel, the distance between said straight line and said fixed axis being variable.

4,016,683

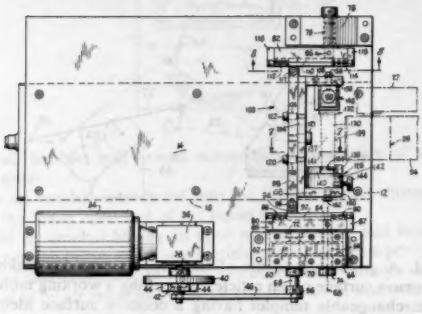
TURBINE BLADE EDGE GRINDER

Salvatore J. Cretella, 180 Fitch St., North Haven, Conn. 06473

Filed Oct. 23, 1975, Ser. No. 625,071
Int. Cl.² B24B *21/00*
U.S. Cl. 51—143 **10 Claims**

1. A machine for resurfacing portions of a turbine blade, comprising in combination:
a. a machine bed,
b. a resurfacing device carried on the bed, comprising a drum and an abrasive member extending around said drum,
c. powered means for driving said device,
d. a carriage carried by the bed,

e. a clamping fixture turnable about an axis on the carriage, having a clamp adapted to hold a turbine blade being resurfaced,
f. means for reversely rocking said fixture about said axis,
g. means for moving the carriage over the bed in directions toward and away from the resurfacing device whereby the blade can be brought into engagement with said device while being simultaneously turned, thereby to resurface the blade along a curved contour, and
h. mounting means for the clamping fixture,



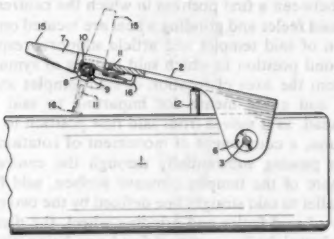
i. said mounting means comprising a pair of end bearings and aligned shafts carried respectively by said bearings, and further including a pair of slides located near opposite ends of the fixture and pivot means connecting each slide to the fixture, for enabling simultaneous lateral adjustment of the fixture and tilting adjustment thereof with respect to the axis of the aligned shafts,
j. said pivot means thereby enabling independent movement of the slides without danger of binding thereof.

4,016,684

SAFETY LEVER LOCK

Paul Urda, South Waverly, Pa., assignor to Ingersoll-Rand Company, Woodcliff Lake, N.J.

Filed Nov. 5, 1975, Ser. No. 629,051
Int. Cl.² B24B *24/00*
U.S. Cl. 51—170 R **2 Claims**



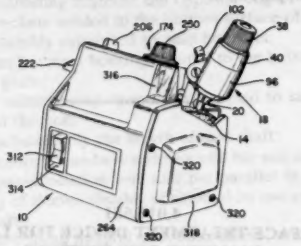
1. An operating lever for hand tools and the like comprising:
an elongated lever member pivotally attached at one end to a tool handle for hand activating a power control means;
said tool handle being generally cylindrical in shape having an axial dimension greater than its diameter;
said elongated lever extending generally axially along said tool handle and having a shape generally conformable to said tool handle without substantial radial projection;
said tool handle having a diameter small enough to be held in one hand and said operating lever being able to be operated by the same hand;
a stop means pivotally disposed on said elongated lever member at its other end;
said stop means comprising a lever extending tab and a tool body contacting tab disposed radially about a pin means;
said lever extending portion and said tab body contacting portion being essentially coplaner; and
said stop means being positioned for ready deflection by the operator's thumb from a first position wherein said stop means is positioned substantially perpendicular to the axis of said elongated lever member and prevents said lever member from rotating, to a second position of said stop means substantially parallel to and coplanar with the axis of said lever means in which position said lever means may be rotated to engate said activating control means, whereby the operator may conveniently and comfortably hold and operate said tool without the danger of accidental tool operation.

4,016,685

SHARPENER FOR TWIST DRILLS EQUIPPED WITH A CHUCK AND DRILL BIT LOCATOR

Robert Gordon Moores, Jr., Cockeysville, and Richard Eugene Walton, II, Baltimore, both of Md., assignors to The Black and Decker Manufacturing Company, Towson, Md.

Division of Ser. No. 456,946, April 1, 1974, Pat. No. 3,930,342. This application Sept. 12, 1975, Ser. No. 612,913
Int. Cl.² B24B *3/26*
U.S. Cl. 51—219 R **4 Claims**



3. In a drill bit sharpener, the subcombination of chucking means adapted to retain a drill bit being sharpened, means for mounting the chucking means in juxtaposition to a grinding wheel, means for adjusting the mounting means transversely of the axis of rotation of the grinding wheel, and selfadjusting locating means carried by the chucking means and engaging the flute wall of the drill bit being sharpened for locating the drill bit at a predetermined disposition with respect to the grinding wheel irrespective of the diameter of said drill bit within a predetermined drill bit diameter range.

4,016,686

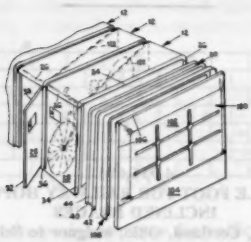
STORAGE ENCLOSURE FOR SMALL VEHICLES

Richard W. Hartger, Grand Rapids, and Richard W. Figgins, Orchard Lake, both of Mich., assignors to Richard W. Harger and Harold V. Hartger, both of Grand Rapids, Mich.

Filed Sept. 2, 1975, Ser. No. 609,558
Int. Cl.² E04H *6/08*
U.S. Cl. 52—65 **23 Claims**

1. Storage apparatus for small vehicles such as bicycles and motorcycles comprising at least one protective storage unit having generally opposite, lateral side edges, at least one roof member, a pair of generally opposite end members, and rigid channel means along at least one of said side edges of said storage unit for joining said roof and end members together and supporting said roof and end members in a protective structure over a supporting surface; said channel means including first wall means for joining said roof and end members to said channel means, second wall means for joining said storage unit to at least one of (1) another of said storage units, (2) a side closure, and (3) a wall or other generally upstanding surface, said first and second wall means defining a drainage channel therebetween which opens outwardly away from the

interior of said unit for draining water off said unit; said roof and end members each including securing means on the other of said opposing side edges for joining said respective member to another of said channel means whereby said storage unit may be used individually or joined to other storage units in side-by-side fashion; hinge means for hingedly securing at least one of said end members to said channel means at one end of said storage unit for access to the interior of said unit; said channel means including a flange extending outwardly along the length thereof for securing said roof and end members thereto; said roof member extending the entire length of



said storage unit between said end members and curving downwardly at either end immediately above said end members; said one hinged end member including an inwardly extending flange along either lateral edge and an end flange extending inwardly toward the interor of said unit at the upper end of said one end member; said hinge means secured between said channel flange and one of said side flanges of said one end member allowing said end member to be opened and closed; said channel flange including a slot receiving said upper end flange of said one end member when said one end member is closed.

4,016,687

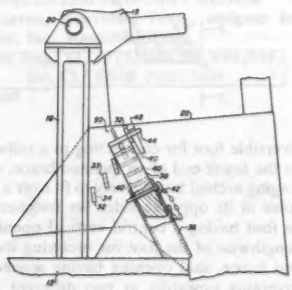
ANGULAR ADJUSTMENT FOR DRILL RIG MAST

T. W. Griffith, Dallas, and Arthur T. Taylor, Carrollton, both of Tex., assignors to Gardner-Denver Company, Dallas, Tex.

Continuation of Ser. No. 527,120, Nov. 25, 1974, abandoned. This application Nov. 13, 1975, Ser. No. 631,771

Int. Cl.² E04H *12/34*

U.S. Cl. 52—116 **6 Claims**



1. In a drilling rig:

a frame;

an elongated mast mounted for pivotal movement on said frame from a transport position to a plurality of angular drilling positions between said transport position and a substantially vertical drilling position with respect to said frame;

actuating means connected to said mast for pivotally moving said mast from said transport position to one of said plurality of angular drilling positions; and,

a plurality of stop members disposed on and projecting from opposite lateral sides of said mast and adapted to be engaged by cooperative means disposed on said frame for automatically stopping said mast in a predetermined one of said plurality of angular drilling positions in response to movement of said mast from said transport position toward said vertical drilling position.

4,016,688

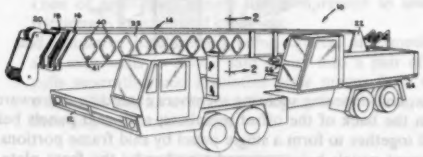
EXTENSIBLE CRANE BOOM STRUCTURE

Joseph B. Tiffin; Daniel G. Quinn, and Evart J. Vroonland, all of Cedar Rapids, Iowa, assignors to FMC Corporation, San Jose, Calif.

Filed May 27, 1975, Ser. No. 581,172

Int. Cl.² B66C *23/04*

U.S. Cl. 52—118 **4 Claims**



1. An extensible crane boom assembly having telescopically interfitting boom sections that include a base section, an intermediate section slidably fitted within the base section, and a top section slidably fitted within the intermediate section; each boom section having four elongated angle chords with normally disposed flanges that are positioned to define the longitudinal corner edges of a box-like configuration, and four elongated plates extending between adjacent angle chords and welded thereto to form the sides, top and bottom of the boom section; each of said elongated plates which form the side webs of the boom section being of uniform thickness and having a top edge, a bottom edge, a pair of side surfaces that are located in spaced apart parallel planes at the juctures of the side surfaces with said top and bottom edges, and a plurality of shaped portions being formed within the plates at locations intermediate the top and bottom edges to space those portions of the plate laterally from said parallel planes, said shaped portions being located at spaced intervals longitudinally of the plate, each shaped portion having a regular geometrical pattern that forms a laterally projecting protuberance on one side of the plate and a corresponding depression on the opposite side of the plate, said shaped portion geometrical pattern being a frustum of a pyramid with a generally diamond-shaped base thereby stiffening the plate between adjacent shaped portions and between these shaped portions and adjacent top and bottom edges of the plate to resist buckling, said plate between adjacent shaped portions having side surfaces within the parallel planes from the top edge to the bottom edge of the plate and providing longitudinal spacing between parallel diagonal lines that coincide with adjacent edges of adjacent shaped portions, each of said shaped portions having an interior panel that is offset from and parallel with the spaced apart parallel planes, some of said interior panels having central openings therein to reduce the weight of the plate.

4,016,689

SOUND ABSORBING PANEL SYSTEM AND METHOD FOR CONNECTING PANELS

Alan C. Wendt, Barrington, Ill., assignor to United States Gypsum Company, Chicago, Ill.

Filed Jan. 20, 1976, Ser. No. 650,589

Int. Cl.² E04B *1/82*

U.S. Cl. 52—145 **7 Claims**

1. A sound absorbing panel system comprising a plurality of juxtaposed, separate sound absorbing panels attached to-

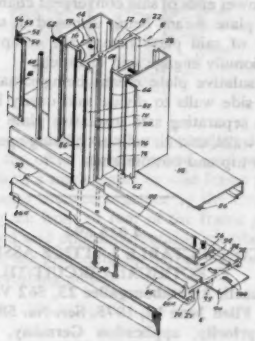
a plurality of mosaic tiles of polygonal outline secured to said elements and anchors and each covering a respective cell.

4,016,695

STRUCTURAL ASSEMBLIES

Richard Lewis Stoakes, "Clouds", Northdown Road, Woldingham, Surry, England

Continuation of Ser. No. 529,054, Dec. 3, 1974, abandoned.
This application May 5, 1976, Ser. No. 683,251
Claims priority, application United Kingdom, Dec. 5, 1973, 56288/73
Int. Cl.² E04B 5/52; F16B 1/00
U.S. Cl. 52—476 **6 Claims**



1. A curtain wall structure comprising, in combination, a series of rigid elongate members attached together in the form of a frame structure, at least two contiguous spaces being provided by the elongate members in the structure to receive infill elements, and sealing means for the peripheries of said infill elements at the boundaries of said spaces, said sealing means comprising a flexible sealing gasket for each said space in the form of a closed loop of a strip-like material, locating elements in a forward region of said frame structure at the periphery of the associated space engaging said gasket, said locating elements at least at a common boundary between each contiguous pair of said spaces comprising a central portion extending along said common boundary and forward portions projecting laterally oppositely away from said central portion, front faces of said forward portions being spaced apart and a recess being provided between said front faces, each forward portion having a respective flexible sealing gasket mounted on it, a forward element of said sealing gasket covering said front face of its forward portion and an inner marginal element of said sealing gasket extending into said recess, the opposed inner marginal elements of the gaskets of said contiguous pair of spaces being compressed against each other in said recess and opposed sides of the recess providing locking engagement faces that the gasket inner portions are urged against by the force of their mutual compression for locking the gaskets in place on said frame structure elements, further resilient sealing means being provided at the rear of the infill elements between said elements and the frame structure.

4,016,696

TIE ROD HOLE PLUG IN COMBINATION WITH A WALL HOLE

Richard C. Mess, Washington Township, Montgomery County, Ohio, and Dusan Tausanovitch, Northport, N.Y., assignors to The Dayton Sure-Grip & Shore Co., Miamisburg, Ohio

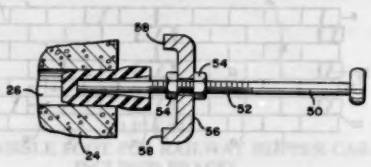
Filed Apr. 4, 1975, Ser. No. 565,000
Int. Cl.² E04F 19/00; E04G 23/02
U.S. Cl. 52—514 **6 Claims**

1. In combination with a wall having a hole formed therein as the result of the removal of a tie rod therefrom, an improved tie rod hole plug received in said hole comprising:

a. a main body section having prior to insertion into said hole an outside dimension in a plane perpendicular to the longitudinal axis of said plug greater than the correspondng inside dimension of said hole whereby said body portion exerts a radially outward sealing force against the surface defining said hole which increases in response to forces tending to push said plug outwardly from said hole,

b. said plug gripping said surface of said hole solely by reason of said radial expansion of said plug after insertion thereof into said hole,

c. a nose section formed integrally with said main body section and having an outside dimension adjacent a leading end thereof in a plane perpendicular to said longitudinal axis of said plug less than said inside dimension of said hole,



d. said nose section tapering from said leading end thereof to said main body section,

e. said leading end of said tapered nose section being substantially flat,

f. the outer surface of said main body and nose sections being substantially smooth and free of grooves and ribs,

g. means defining a tool-receiving socket extending axially of said plug within said main body section thereof and being closed at said leading end of said nose section, and

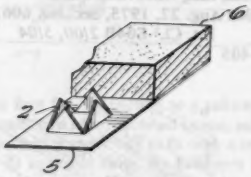
h. said tool-receiving socket being substantially void of plug-expending means.

4,016,697

CONSTRUCTION UNIT

Richard Ericson, Park Ridge, Ill., assignor to United States Gypsum Company, Chicago, Ill.

Continuation of Ser. No. 864,625, Oct. 8, 1969, abandoned.
This application Jan. 27, 1975, Ser. No. 544,638
Int. Cl.² E04C 2/00; E04B 1/16
U.S. Cl. 52—622 **9 Claims**



1. A load-bearing structural unit comprising a hardened cementitious body portion of high compressional strength and a substantially continuous sheetlike tensile member integral with and contiguous to said body portion extending substantially over the entire area of said body portion and disposed at a substantial distance beyond a substantially centrally located plane of said unit and a structural stress resistant bonding joint between said tensile member and said body portion, said bonding joint comprising a plurality of closely spaced portions of said tensile member embedded and extended into said body portion in the direction of said substantially centrally located plane, said portions of said tensile member embedded into said body portion comprising prongs integral with and at

substantially right angles to said sheetlike tensile member and extending from the periphery of holes in said tensile member and the total area of said prongs is at least about 2% of the total area of said tensile member, substantially each of said holes are positioned in a row, along with other holes, parallel to the length of said unit and in another row at right angles to said length, all rows are positioned in a right angularly disposed reticulated cross hatch relationship, whereby the holes at the intersection of any pair of adjacent and parallel rows of holes lengthwise and crosswise of said tensile member are in a boxlike configuration, and continuous strips of nonperforated portions of said sheetlike tensile member extending between the said rows of said holes parallel and at right angles to said length.

4,016,698

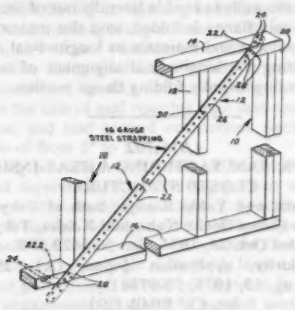
BRACING FOR STUD WALLS

Delmar R. Rogers, Shakopee, Minn., assignor to United Steel Products Co., Montgomery, Minn.

Continuation-in-part of Ser. No. 447,296, March 1, 1974, abandoned. This application June 30, 1975, Ser. No. 591,875

Int. Cl.² E04C 2/38, 3/18

U.S. Cl. 52—656 **3 Claims**



1. In combination, a wooden stud wall for a building and the like and a diagonal brace for tensile loading for the wall to prevent the wall from sagging under a racking load, the stud wall having horizontally extending and vertically spaced top and sole plates between which are fastened spaced and upright studs, the wall having end studs between the terminal ends of the top and sole plates, the brace comprising an elongate and flat metal strap with a plurality of preformed holes spaced from each other along the length thereof, the metal strap extending continuously from the top plate to the sole plate and extending diagonally across the studs and the top and sole plates on one side of the stud wall and being nailed to each of the studs crossed and to the sides of the top and sole plates, the ends of the metal strap being bent over into flush engagement with the upper and lower surfaces of the top and sole plates and extending obliquely across such plate surfaces, the upper end of the metal strap being bent around the corner between the side and top surface of the top plate at a location closely adjacent the terminal end of the top plate, and the upper end of the strap lying on the top plate in superposed relation to the upper end of the end stud of the stud wall, and the upper and lower ends of the metal strap being secured flush against the plates by nails driven vertically through the preformed holes and solidly into the plates.

4,016,699

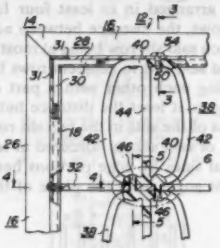
DECORATIVE GRILLE STRUCTURE

Arnold Hurvitz, 327 Rosemary Lane, Narbeth, Pa. 19072

Filed Aug. 27, 1975, Ser. No. 608,075

Int. Cl.² E06B 7/08

U.S. Cl. 52—663 **2 Claims**



1. A decorative grille structure comprising, a frame having four side members connected together at their ends in the form of a rectangle, each of said side members having an identical substantially C-shaped channel section, the channel section of each of the side members includes a base, legs extending from the base, and feet extending toward each other from the ends of the legs with the ends of the feet being spaced apart, and a plurality of L-shaped corner connectors each having a pair of legs, the side members being connected together by the L-shaped corner connectors with each leg at each corner connector fitting tightly within the channel section at the end of a side member, a plurality of spaced, parallel rods extending between and secured to two opposed parallel side members, each of the rods having an end portion extending into the channel section of the two opposed side members between the feet of the channel section, and a screw extending through a hole in the base of each channel section and threaded into a hole in the respective end portion of the rod to secure the rod to the side member, and a plurality of decorative grille elements mounted in rows between adjacent rods and between each of the other two parallel side members and an adjacent rod, each of said grille elements having top and bottom ends including attachment means comprising a pin integral with and projecting from the grille element and a hole in the grille element spaced from the pin, each of the grille elements which extend to a rod being connected therewith by having the pin of its attachment means extend through the rod to the hole of the attachment means of a grille element on the other side of the rod and each of the grille elements which extends to one of the other side members has an end extending into and being secured to the channel section of the side member between the feet of the channel section with the pin of its attachment means removed, and a screw extending through the base of the channel section and being threaded into the hole of the attachment means of the grille element to secure the grille element to the side member.

4,016,700

STRUCTURAL SHEET METAL BAR MEMBER FOR USE IN HEAT INSULATING BUILDING PARTS

Hans Carl Magnus Blomstedt, Stockholm, Sweden, assignor to Interoc Fasad Aktiebolag, Koping, Sweden

Filed Oct. 9, 1975, Ser. No. 621,059

Claims priority, application Sweden, Oct. 16, 1974, 7413045

Int. Cl.² E04C 3/09

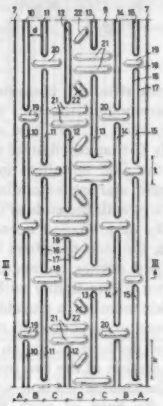
U.S. Cl. 52—735 **7 Claims**

1. A sheet metal bar member for use as a distancekeeping, stiffening and load-supporting structural framing element in heat insulating building parts of the general class comprising two panels held together in spaced relationship by a framing and having the interspace between them at least partially filled with a heat insulating material,

said bar member comprising a pair of flange portions paralleling and serving as attachments for said panels and an integral web between said flange portions, the plane of said web being substantially at right angles to the planes of the panels,

said web portion being perforated by open slits extending in the longitudinal direction of said bar member,

said slits being arranged in at least four laterally spaced longitudinal rows, the distance between adjacent ends of said slits in each said slit row being at most one half of the slit length, and said slits in adjacent rows being staggered and overlapping each other with a part of their length corresponding to at least the distance between the most adjacent edges of the slits in the two slit rows in question, wherein each of said slits is bordered at least along both its longitudinal sides by edge portions bent out approximately at right angle from the plane of the web portion



and projecting to a height over the surrounding web surface corresponding to several times the sheet metal thickness, wherein first elongate through-like embossments are pressed out of the plane of the web portion to extend transversely between adjacent slit ends in each slit row, said first embossments being doubled between the slit ends in at least some of the slit rows and each having a sufficient length in the direction of width of the web portion to extend almost up to the adjacent slit row on either side of the slit row in question, and wherein second elongate trough-like embossments are pressed out of the plane of the web portion to extend at a slightly oblique angle to the longitudinal direction of the bar member between at least two of the slit rows of the web portion, whereby said web portion is stiffened with reduced thickness of the sheet metal needed for forming the bar member and heat transfer across said web between said flange is reduced.

4,016,701

CONTROLLED EXPANSION SUSPENDED CEILING GRID MEMBER

John O. Beynon, Waterloo, Canada, assignor to Ceiling and Drywall Products Limited, Waterloo, Canada

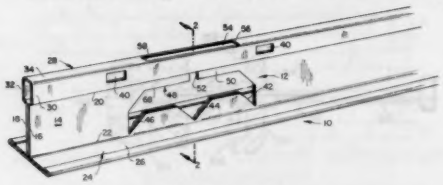
Filed Nov. 24, 1975, Ser. No. 634,643

Claims priority, application Canada, Nov. 18, 1975, 239918

Int. Cl.² E04C *3/30;* **E04B** *1/68*

U.S. Cl. 52—735 **23 Claims**

1. A controlled expansion suspended ceiling grid beam for a suspended panel ceiling comprising a web having spaced-apart marginal edges, a flange having a panel supporting surface provided along one of said marginal edges, a bead being provided along the other of said marginal edges, said bead having substantially planar spaced-apart sidewalls which are continuous at least along the upper and lower bead portions and an interconnecting substantially planar top wall, said bead sidewalls being unconnected at the bead's base and an expansion accommodating portion for accommodating thermal expansion at a predetermined location in said beam comprising three substantially evenly spaced-apart notches cut in the web having lower and upper ends, said lower end of each notch being in the form of an apex and located at least near to the plane defined by the panel supporting surface of the flange, the web above said notches being severed in a manner to provide a web severance bridging the upper ends of said notches which leaves a first strip of the web extending along the bead's base, the bead's top wall having slot means cut



therein, said slot means being substantially centrally located over the middle notch of said three notches with said slot means extending to adjacent points above the notches on each side of the middle notch, said three notches permitting said flange to bend in the area of each said notch apex whereby said flange folds downwardly away from said bead to accommodate thermal expansion in said beam, said slot means essentially freeing the bead's sidewalls as they lie in their respective planes from transverse connection over the slot means' length to adapt said side walls to buckle laterally out of their respective planes as said flange is folded, said slot means adapting said bead to collapse and maintain its longitudinal alignment without offsetting the longitudinal alignment of said flange apart from the downwardly folding flange portion.

4,016,702

METHOD FOR MANUFACTURING A HEAT-INSULATING CLOSED STRUCTURE

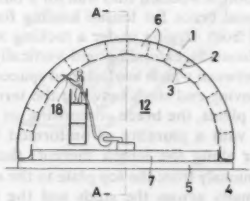
Hiroshi Nakada, and Yukio Kosuge, both of Tokyo, Japan, assignors to Showa Denko Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 24, 1975, Ser. No. 625,379

Claims priority, application Japan, Oct. 29, 1974, 49-123884; Aug. 13, 1975, 50-97481

Int. Cl.² E04B *1/00*

U.S. Cl. 52—743 **4 Claims**



1. A method for the manufacture of a heat-insulating closed structure, which comprises the steps of:

forming a composite membrane having an inner membrane, which is formed of a gas-impervious and transparent substance having small holes at appropriate intervals thereof, disposed a distance from the inside of an outer membrane, which is formed of a gas impervious substance, through the medium of spacers;

fastening said composite membrane to a heat-insulating floor member in an edge-to-edge manner;

applying pressure to the space enclosed by said composite membrane and said heat-insulating floor member for

thereby inflating the composite membrane and allowing it to stand up on its own;

injecting a foaming dope into the cavity defined between the inner membrane and the outer membrane from the interior of said structure and through said small holes of said inner membrane; and allowing the foaming dope to foam and set, whereby the use of said transparent inner membrane facilitates the monitoring of said injection of said dope from the interior of said structure.

4,016,703

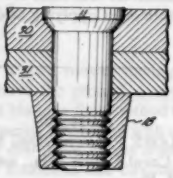
COMBINATION OF A WEDGE HEAD PIN FASTENER AND OVERLAPPED WORK PIECES

Louis A. Champoux, Seattle; Joseph G. Falcioni, Tacoma, both of Wash., and Morton Mendels, Torrance, Calif., assignors to The Boeing Company, Seattle, Wash.

Division of Ser. No. 400,334, Sept. 24, 1973, abandoned. This application Apr. 10, 1975, Ser. No. 566,905

Int. Cl.² F16B *35/06, 5/00*

U.S. Cl. 403—404 **17 Claims**



1. A combination, comprising: a plurality of overlapped work members having an opening extending therethrough, a portion of said opening being a countersink, said countersink having first and second countersink sections, said first countersink section being positioned axially inwardly from said second countersink section and having a greater angle with respects to the axis of said opening than said second countersink section and said second countersink section having a taper angle of from 5° to 35°;

a fastening pin which comprises: a head having first and second tapered sections for engagement with said first and second countersink sections respectively, said first tapered section having a substantially larger taper angle than said second tapered section, said first tapered section having a taper angle sufficiently large to substantially prevent pull-through of said pin fastener in said opening upon engagement of said first tapered section with said first countersink section, said second tapered section having a taper angle of from 5° to 35°, said pin and said opening being sized such that an interference fit of from 0.002 to 0.008 inches results between at least a portion of said second tapered section and said second countersink section when said fastening pin is operatively positioned in said opening; and

a shank depending from said head and receivable in said opening.

4,016,704

METHOD AND APPARATUS FOR ENCAPSULATING CONTAINER WITH TUBULAR WRAPPING MEMBER

Masaaki Fujio, 8, 3-15 Aoyamadai, Suita, Osaka, Japan

Filed July 2, 1975, Ser. No. 592,528

Int. Cl.² B65B *9/00, 53/00, 61/00*

U.S. Cl. 53—3 **10 Claims**

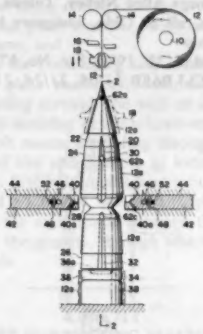
1. A method of encapsulating a container with a tubular wrapping member comprising the steps of:

a. concentrically aligning an elongate guide member with a container to be encapsulated to position one end of the guide member proximate to the container;

b. feeding a substantially continuous tubular wrapping member towards the guide member;

c. cutting the tubular wrapping member into substantially equal portions having predetermined lengths;

d. placing said wrapping member portions successively onto the other end of said guide member; and



e. advancing said wrapping member portions along said guide member towards said one end by engaging the trailing edges of said wrapping member portions and pushing the same until said wrapping member portions are transferred onto successive containers which have been brought into alignment with said guide member.

4,016,705

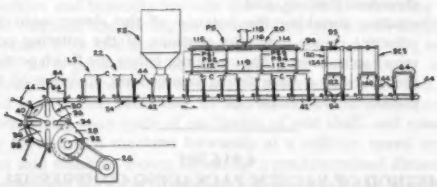
METHOD AND APPARATUS FOR PURGING AIR FROM CONTAINERS

Donald C. Wilson; Samuel A. Mencacci, both of San Jose, and Jurgen H. Strasser, Mountain View, all of Calif., assignors to FMC Corporation, San Jose, Calif.

Filed Nov. 1, 1974, Ser. No. 520,085

Int. Cl.² B65B *31/02*

U.S. Cl. 53—11 **16 Claims**

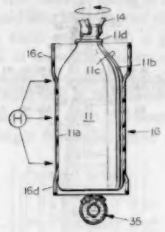


15. A method of purging air from an open ended container, the method comprising the steps of maintaining an open bottomed steam tunnel with the steam flowing downward out of said tunnel through the bottom thereof at a velocity of at least 0.5 feet per second, moving the open ended container in a path through the steam in a direction transverse of the flow direction of the steam, baffling the area spaced above but adjacent to the open end of the container to cause the steam-air mixture to flow transversely outwardly from the container, and directing the low velocity steam downwardly for entraining the steam-air mixture to draw the mixture away from the open end of the container and out of the bottom of the tunnel.

4,016,706
METHOD OF CONTROLLING SHRINKAGE OF A SLEEVE WRAP ON A CONTAINER

Frederick William Braker, Toledo; Russell William Heckman, Perrysburg; George Allen Nickey, Toledo, and Terry Clair Potter, Sylvania, all of Ohio, assignors to Owens-Illinois, Inc., Toledo, Ohio

Filed Mar. 31, 1976, Ser. No. 672,229
Int. Cl.² B65B *53/06, 21/24, 21/26*
U.S. Cl. 53—14 **18 Claims**



1. The method of shrinking a heat shrinkable plastic sleeve form onto a container, said container having a major diameter body portion and one or more substantially smaller portions of minor diameter including a finish portion defining a mouth opening to the container, comprising the steps of

providing containers in upright position at a loading station,

grasping the containers by their upper finish portions at the loading station by a chuck device carried on a conveyor,

moving the conveyor past a source of sleeves slightly larger in size than the major diameter of the container and made of a polyolefin plastic material that is pre-oriented circumferentially at least for 30% or greater shrinkage upon heating,

assembling a sleeve of said material axially over the container, the sleeve being of a height dimension so as to extend from adjacent the finish portion of the container to adjacent the other end thereof,

conveying the container and sleeve in an oven maintained at elevated temperature sufficient to shrink said material of the sleeve onto the container,

rotating the container and sleeve about their central axis while in the oven at a rate of rotation that is sufficient to generate a centrifugal force component on the sleeve so as to maintain the plastic of the sleeve overlying said minor diameter portions of the container erect and billowed out for a time while the portion of said sleeve adjacent the major diameter portion of the container is shrunken thereon, and

thereafter shrinking the balance of the sleeve onto the adjacent minor diameter portions of the rotating container so as to wrap the container below the finish portion thereof with a snug fitting conforming covering of the plastic on the exterior of the container.

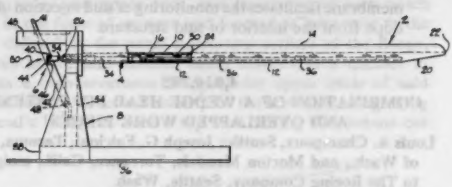
4,016,707
METHOD OF VACUUM PACKAGING COMPRESSIBLE MATERIALS AND APPARATUS

John Edward Puchosic, McPherson, Kans., assignor to Johns-Manville Corporation, Denver, Colo.

Filed Mar. 3, 1976, Ser. No. 663,373
Int. Cl.² B65B *1/26, 63/02*
U.S. Cl. 53—24 **14 Claims**

1. In method of packaging a compressible material having a generally cylindrical configuration wherein said compressible material is placed inside a tubular container made from a flexible fluid impervious material, a partial vacuum is created inside said container by withdrawing air from the container to compress the compressible material inside the container, and a restraining sleeve is applied around said compressed container to maintain the compressible material in a compressed state when said partial vacuum is lost, the improvement comprising:

closing any open ends of said container after said compressible material has been placed therein, creating a seal around a portion of the exterior of said flexible container,

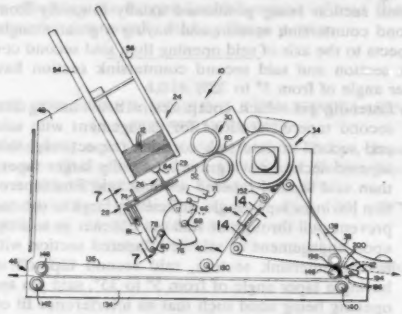


making one or more perforations in the flexible fluid impervious material within said sealed area and withdrawing air from inside the container through said perforations until said compressible material has been compressed to a diameter less than the size of said retaining sleeve, and there after applying said restraining sleeve.

4,016,708
ENVELOPE PROCESSING MACHINE

John R. DeHart, Coral Gables, Fla., assignor to Docutronix, Inc., Homestead, Fla.

Continuation-in-part of Ser. No. 496,977, Aug. 13, 1974, abandoned. This application Aug. 13, 1975, Ser. No. 604,249
Int. Cl.² B65B *43/30*
U.S. Cl. 53—381 R **41 Claims**

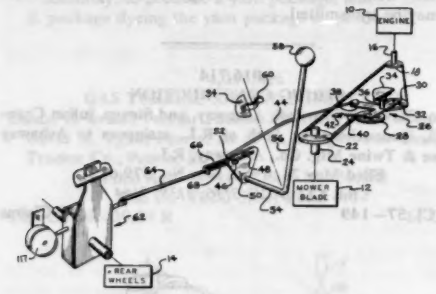


1. A machine for processing an envelope including two panels having connected edges comprising means for advancing the envelope along a generally predetermined path, and cutter assembly for engaging the advancing envelope and severing only one of the panels inwardly of at least one associated connected edge thereof and along a line of severance generally parallel to the one associated connected edge, said cutter assembly including at least one rotary cutting unit, said cutting unit having a cutter wheel supported for rotation about an axis extending transversely of said path and an anvil wheel supported for rotation about an axis parallel to the axis of said cutter wheel and having an annular groove in its peripheral surface receiving an associated peripheral edge portion of said cutter wheel therein, said groove having a cross sectional configuration substantially complementing the cross sectional configuration of said associated peripheral edge as viewed in a radial plane, said peripheral edge portion and said groove defining a nip therebetween, and means for maintaining said associated peripheral portion in spaced relation to said anvil wheel within said groove.

4,016,709
SAFETY SYSTEM FOR LAWN MOWERS

Hans Hauser, Fredericktown, and Devin R. Cline, Mount Vernon, both of Ohio, assignors to The J. B. Foote Foundry Co., Fredericktown, Ohio

Filed June 23, 1975, Ser. No. 589,192
Int. Cl.² A01D 35/26
U.S. Cl. 56—10.2 16 Claims

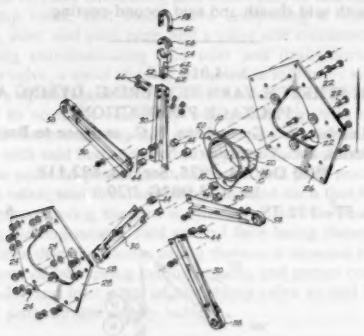


1. In combination, a lawn mower having a wheel for supporting the mower above the ground, a rotatable blade, and means for driving said blade, a first toothed member rotatable with said wheel, and means associated with said toothed member for disconnecting said drive means from said blade when said toothed member rotates in one direction.

4,016,710
BAT SUPPORT SPIDER FOR A HARVESTER REEL

Donald L. May, and Archie E. Neal, both of Garfield, Wash., assignors to J. E. Love Company, Garfield, Wash.

Filed May 12, 1976, Ser. No. 685,717
Int. Cl.² A01D 57/02
U.S. Cl. 56—220 4 Claims



1. A bat support spider for a harvester reel of a type comprising an elongated thin walled center tube of substantial diameter having good resistance to bending and mounting means for the bat support spider comprising a plurality of radial mounting lobes spaced apart circumferentially about the tube, to which the bat support spider is attached, said bat support spider comprising:

a hub assembly comprising first and second hub plate members together forming a plurality of corner portions, said hub plate members extending radially of the center tube and being spaced apart axially when in use:

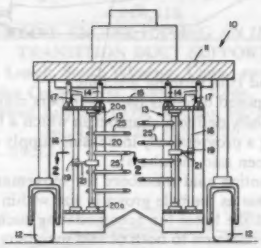
a plurality of radial bat support arms equal in number to said corner portions, each said bat support arm having a base portion of channel form in cross section comprising a pair of radial gussets in coplanar parallelism, a radial web spaced axially from said gussets, and a pair of generally axially extending flanges interconnected between the web and the gussets, with the base portion of each said bat support arm being located between the first and second plates at a related corner portion, and said first hub plate member being contiguous the web of the arm and the second hub plate member being contiguous the gussets of said arm; and

fastener means for connecting said arms to said first and second hub plate members, comprising bolt fastener means extending through the web of each arm and the first hub plate member at the related corner portion, and additional bolt means extending through both hub plate members and the arm gussets at locations radially inwardly of the first bolt means, and tubular spacer means for each said additional bolt means, positioned to substantially fill the axial space between the first hub plate member and the gussets, through which the second bolt means extends.

4,016,711
VINE-FRUIT HARVESTING MACHINE WITH INCLINED-TIP STRIKER RODS

Gerald L. Claxton, Fresno, Calif., assignor to Up-Right, Inc., Berkeley, Calif.

Filed June 9, 1975, Ser. No. 585,103
Int. Cl.² A01D 46/00
U.S. Cl. 56—330 10 Claims



1. In a grape-harvesting machine having a frame adapted to straddle and move along a row of grapevines, a vertical striker rod support shaft carried by said frame at one side of the longitudinal centerline of said machine, an elongated striker rod mounted at one end thereof to said shaft for oscillation of said rod about said one end upon oscillation of said shaft about its vertical axis, said striker rod extending generally horizontally from said shaft and extending rearwardly of said machine and inwardly towards the longitudinal centerline of said machine and having an elongated tip portion at the end opposite from said one end thereof, means for oscillating said shaft at a predetermined rate about its vertical axis and through a limited horizontal arc to move said tip portion to said longitudinal centerline of said machine and away therefrom during each cycle of oscillation of said shaft, and means for moving said machine forwardly at a uniform speed such that said machine moves forwardly a predetermined distance during each full cycle of oscillation of said shaft, the improvement comprising:

means preventing rotation of said rod about its longitudinal axis,

said rod being normally straight throughout the major portion of its length and said straight portion thereof being made of resilient material,

said elongated tip portion of said rod extending from said major portion thereof, said tip portion being generally horizontal and being inclined to said major portion at a horizontal angle on the side of said rod towards the longitudinal centerline of said machine equal to approximately 180° plus the angle between said longitudinal centerline and said straight portion of said rod when said tip portion

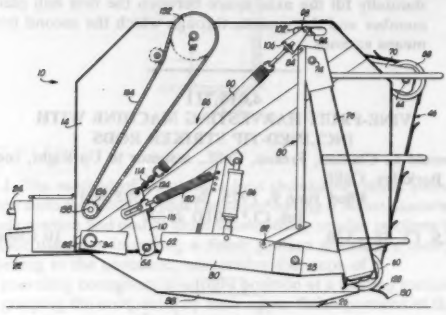
is at said longitudinal centerline, said tip portion having a length substantially equal to said predetermined distance that said machine moves forwardly during a full cycle of oscillation of said striker rod support shaft.

4,016,712

MACHINE FOR FORMING HIGH DENSITY ROUND BALES

Melvin Victor Gaeddert, Newton, and Bobby Dwayne McWhirt, Hesston, both of Kans., assignors to Hesston Corporation, Hesston, Kans.

Filed Feb. 25, 1976, Ser. No. 661,158
Int. Cl.² A01D *39/00*
U.S. Cl. 56—341 **13 Claims**



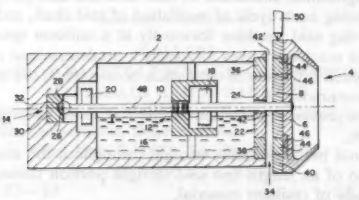
1. In a round bale forming machine:
a pair of opposed bale-engaging members cooperating to at least partially define a chamber in which a bale is formed by rolling a progressively increasing supply of crop material between said members;
means mounting said members for movement away from one another as the bale grows in size within said chamber to expand the latter for accomodating such growth; and
mechanism common to both of said members for rendering the latter equally yieldably resistant to said movement and each responsive to force changes in the other.

4,016,713

DRIVE FOR HIGH-SPEED AXLES OR SHAFTS OF SPINDLES

Alfred Lüuger, Immenstaad, and Jochen Schrade, Markdorf, both of Germany, assignors to Dornier System GmbH, Germany

Filed July 2, 1975, Ser. No. 592,399
Claims priority, application Germany, Aug. 23, 1974, 2440455
Int. Cl.² D01H *1/12*; F16C *19/30*
U.S. Cl. 57—100 **2 Claims**



1. In a drive for a high-speed axle or shaft of a spindle including a spinning can having a radially-extending wall mounted at one end of a rotatable shaft, a parallel housing wall positioned opposite said can with a gap between them, and a spiral groove cap-type bearing in said housing and in which the other end of said shaft is mounted,
the improvement comprising direct-current drive motor means with electronic commutation, said motor having a stator ring with segment winding mounted in said wall of said housing,
permanent magnet means in said radially-extending wall of said spinning can, said magnet means being magnetized in the direction of the longitudinal shaft axis,
and disc means connecting said magnets, whereby the magnetic field is closed and the magnetic field pressure flow may be transmitted.

4,016,714

STRING CONSTRUCTION

Julian Tiltsworth Crandall, Ashaway, and Steven Julian Crandall, Quonochontaug, both of R.I., assignors to Ashaway Line & Twine Mfg. Co., Ashaway, R.I.

Filed May 21, 1975, Ser. No. 579,612
Int. Cl.² D02G *3/36*, *3/38*, *3/44*
U.S. Cl. 57—149 **9 Claims**

1. A string construction comprising as it essential ingredients a thermoplastic core, a first coating on said core consisting of a cured cationic lubricating agent, and a second coating comprising a thermoplastic resin surrounding and bonded to said first coating.

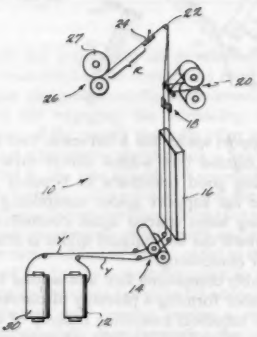
6. In the string of claim 1, an armor sheath of thermoplastic surrounding said second coating, and a further coating of said thermoplastic resin surrounding said armor sheath and integrated with said sheath and said second coating.

4,016,715

HIGH STRETCH YARN TEXTURING, DYEING AND PACKAGE PRODUCTION

Joe F. London, Jr., Greensboro, N.C., assignor to Burlington Industries, Inc., Greensboro, N.C.

Filed Oct. 14, 1975, Ser. No. 622,118
Int. Cl.² D02G *1/20*
U.S. Cl. 57—157 TS **5 Claims**



1. A method of high stretch yarn texturing and yarn package preparation comprising the steps of
a. false twist texturing a continuous filament yarn at a false twisting station,

b. directing said false twist textured continuous filament yarn from said false twisting station generally downwardly and toward a take-up assembly including a dye spring,

c. overfeeding said yarn to said take-up assembly, the overfeed being greater than 30 percent, so that said yarn may relax before being taken up by said die spring and so that the skein shrinkage of said yarn after dyeing will be maximized, and interlacing said yarn filaments while directing them downwardly and overfeeding them to said take-up assembly, to produce a yarn package, and

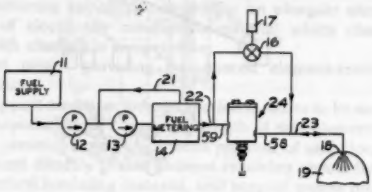
d. package dyeing the yarn package so produced.

4,016,716

GAS TURBINE ENGINE DUMP VALVE

Duane E. Evans, Peoria; Thomas M. Tabor, East Peoria, and David A. Tyler, Peoria, all of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed Apr. 20, 1970, Ser. No. 30,081
Int. Cl.² F02G 3/00; F02C 9/04
U.S. Cl. 60—39.09 R **11 Claims**



1. A fuel system for a gas turbine engine comprising a fuel supply, fuel metering means, pump means connecting said supply to said metering means, a fuel supply valve including an inlet port and an outlet port, said valve operable to selectively open or close communication between said inlet and outlet ports, a nozzle for introducing fuel to a combustion chamber, a fuel line connecting said metering means to said inlet port, a second fuel line connecting said outlet port to said nozzle, and a dump valve, said dump valve comprising a body having drain, inlet, and pilot ports and a valve seat circumscribing an opening communicating said inlet and drain ports of said dump valve, a spool slidably mounted in said body and having a valve tip engagable with said seat, means spring loading said spool to normally resiliently engage said tip with said seat, means communicating said inlet and pilot ports of said dump valve with said first and second opposed faces of said spool to expose same to pressures at said inlet and pilot ports of said dump valve, said first face being disposed such that force due to pressure acting thereon is directed to aid the force of the spring loading means, said second face being disposed such that force due to pressure acting thereon is directed to oppose the force of said spring loading means, and means connecting said pilot and inlet ports of said dump valve to said inlet and outlet ports of said supply valve.

4,016,717

MATCHING RESPONSE OF A BLADE PATH TEMPERATURE LIMIT SIGNAL TO CHARACTERISTICS OF A GAS TURBINE

Jack R. Smith, Pittsburgh, and Leonard H. Burrows, Gibsonia, both of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

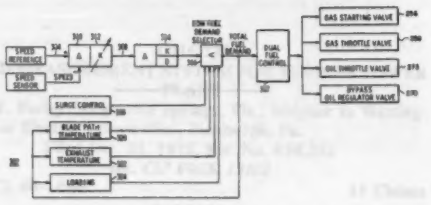
Filed Feb. 19, 1975, Ser. No. 551,202
Int. Cl.² F02C 9/08
U.S. Cl. 60—39.28 R **10 Claims**

6. Apparatus for controlling fuel flow to a turbine including:

a. input means for receiving representations of information concerning predetermined turbine operating parameters;

b. speed control means, including means for generating a turbine speed setpoint, operably related to said input means for developing a speed error for use in adjusting fuel flow;

c. temperature control means, including means for generating a blade path temperature error which changes at a first rate under a first condition when the measured temperature is above the setpoint and at a second rate under a second condition when the measured temperature is



below the setpoint, operably related to said input means, for developing a temperature limit for use in adjusting fuel flow; and

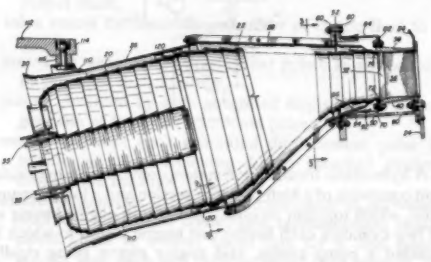
d. selector means, operably related to said speed control means, said temperature control means and the turbine, for selecting in accordance with a predetermined criteria said speed error or said temperature limit for use in adjusting fuel flow.

4,016,718

GAS TURBINE ENGINE HAVING AN IMPROVED TRANSITION DUCT SUPPORT

Lawrence J. Lauck, South Windsor, Conn., assignor to United Technologies Corporation, Hartford, Conn.

Filed July 21, 1975, Ser. No. 597,876
Int. Cl.² F02C 7/20, 3/00
U.S. Cl. 60—39.32 **12 Claims**



1. In combination in an axial flow gas turbine engine having a combustion section including a plurality of burners disposed circumferentially about the engine axis for receiving and mixing compressed air and fuel in a combustion process to produce propulsive gases which are transmitted from the plurality of burners through a plurality of circumferentially disposed transition ducts between the respective burners and a turbine inlet at the turbine section, the improvement comprising:

an outer support ring connected to the plurality of transition ducts and positioned in the engine coaxially of the engine axis, the outer ring circumscribing the transition ducts radially outside of the ducts;

an inner support ring connected to a plurality of transition ducts and positioned in the engine coaxially of the engine axis, the inner ring extending around the engine axis radially within the circumaxially disposed transition ducts;

a plurality of struts extending from the outer support ring to the inner support ring, the struts being interdigitated between the transition ducts; and

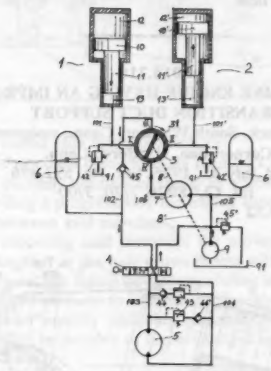
one of the support rings being fixedly secured in the engine between the combustion and turbine sections for holding the transition ducts in the engine, and the other of the support rings being suspended in the engine by the struts from said one of the support rings, said other of the support rings thereby being free to expand and contract radially in the engine with the transition ducts.

4,016,719

HYDROSTATIC TRANSMISSION SYSTEM

Amotz Yavnai, Kiriat Bialik, Israel, assignor to Technion Research and Development Foundation, Ltd., Haifa, Israel

Filed Mar. 30, 1976, Ser. No. 672,019
Claims priority, application Israel, Mar. 30, 1975, 46964
Int. Cl.² F15B 1/02
U.S. Cl. 60—416 6 Claims



1. A hydrostatic transmission system comprising a hydraulic circuit consisting of a high-pressure section and a low-pressure section, which together include a free-piston engine having at least two cylinders each having one engine piston to which is connected a pump piston, said engine piston being rigidly connected to said pump piston for the purpose of joint axial motion;

at least one rotary motor or linear actuator adapted to be driven by the hydraulic fluid pressurized by said piston pumps;

valve means for directing the hydraulic fluid to and from said motor or actuator;

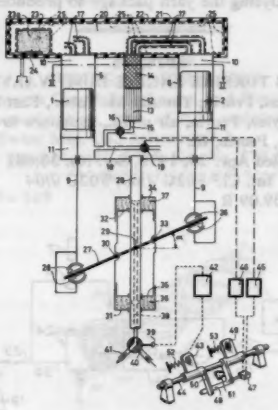
means for controlling the operation of said free-piston engine, said controlling means comprising a rotary distributor and a rotary, auxiliary hydraulic motor of the positive displacement type in the low-pressure section of the circuit, said auxiliary hydraulic motor being provided with transmission means for driving said rotary distributor at the number of revolutions governed by the frequency of said free-piston engine, said rotary distributor being provided with ports for alternately connecting each pump cylinder in turn to the high-pressure section and to the low-pressure section of the hydraulic circuit in such an order that each pump is connected to the high-pressure section during at least part of its pumping stroke from the stroke's beginning, and to the low pressure section during the entire length of its return stroke.

4,016,720

HOT-GAS RECIPROCATING ENGINE

Roelf Jan Meijer, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Mar. 22, 1976, Ser. No. 669,323
Claims priority, application Netherlands, Apr. 1, 1975, 7503828
Int. Cl.² F02G 1/06
U.S. Cl. 60—524 1 Claim



1. A hot-gas reciprocating engine comprising at least three double-acting pistons which are each reciprocable in an associated cylinder and which each separate therein a space of variable volume and lower temperature during operation from a space of variable volume and higher temperature during operation, the space of lower temperature in each cylinder being connected, via at least one of a plurality of regenerators and at least one of a plurality of heat-exchangers, to the space of higher temperature in one of the other cylinders, the volume variations of each space of higher temperature leading in phase those of the space of lower temperature connected thereto; at least one heating device for supplying heat to the heat exchangers, which device comprises at least one reservoir which contains a heat-storing material which can be heated and which material is in heat-exchanging relationship with the heat exchangers during operation; a respective drive rod coupled to each of the pistons, which co-operates, by way of a sliding body, with a swash-plate which is tiltably mounted on a rotatable shaft; and means for tilting the swash-plate to increase or decrease its inclination relative to the shaft in order to increase or decrease, respectively, the stroke of the pistons; characterized in that each space of lower temperature is also connected, via one of the regenerators and one of the heat exchangers, to one of the spaces of higher temperature, in which space the volume variations lag in phase behind those in the space of lower temperature connected thereto, the connections between each space of lower temperature and the two spaces of higher temperature connected thereto including valves which are operated by means for selectively opening one of the two connections, which means for opening, when opening the connections between the spaces of lower temperature and the spaces of higher temperature wherein the volume variations occur which lag in phase behind those in the relevant space of lower temperature, causes the means for tilting the swash-plate to be operated to tilt the plate further in the direction to increase its inclination, the means for tilting the plate being operable independently of the means for selectively opening one of the two connections.

4,016,721

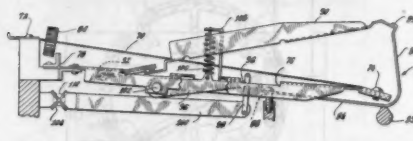
POSITIONING DEVICE USING NEGATIVE SPRING-RATE TENSIONING MEANS

David A. Richardson, Sheldonville, and Robert J. Robinson, Lexington, both of Mass., assignors to The Foxboro Company, Foxboro, Mass.

Division of Ser. No. 444,824, Feb. 22, 1974, Pat. No. 3,940,935, which is a continuation of Ser. No. 239,906, March 31, 1972, abandoned. This application Sept. 15, 1975, Ser. No. 613,229

Int. Cl.² F03G 7/06

U.S. Cl. 60—528 5 Claims



1. Positioning apparatus comprising: an elongate element formed of electrically conductive material which changes length with changes in temperature;

support means providing two spaced element-receiving means;

said support means including a motion member to be moved in response to the changes in length of said element;

means securing respective spaced portions of said elongate element directly to said element-receiving means free of electrical insulating material, said support means providing an electrically conductive path which in cooperation with said electrically conductive element establishes a closed loop adapted to carry electrical current; and

winding means inductively coupled to said closed loop to develop an alternating magnetic field passing through said closed loop, said winding means and said closed loop together forming a transformer with said winding means serving as the transformer primary winding and said closed loop serving as a single-turn transformer secondary winding;

the electrical voltage induced in said single-turn closed-loop secondary winding by said alternating magnetic field being effective to develop current therein of controllable magnitude, so as to control the temperature of the section of said elongate element between said spaced portions.

4,016,722

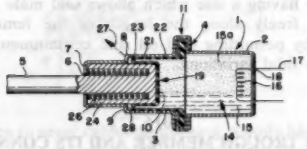
SAFETY BLOW-OUT PROTECTION FOR FLUID ACTUATORS

Otto C. Niederer, Sr., Madison, Ohio, assignor to Gould Inc., Chicago, Ill.

Filed May 2, 1975, Ser. No. 573,984

Int. Cl.² F03G 7/06

U.S. Cl. 60—531 19 Claims



1. A fluid actuator device, comprising a body, an extensible means in sealed engagement with said body for forming a variable volume pressure chamber, said extensible means being movable with respect to said body to effect changes in the volume of said pressure chamber and thus to convert normal pressure variations in said pressure chamber to mechanical energy, said extensible means comprising a diaphragm, means for controllably relieving pressure in said pressure chamber when an abnormal pressure level occurs therein in excess of a predetermined level, said means for controllably relieving comprising means for facilitating controlled fracturing of said diaphragm.

4,016,723

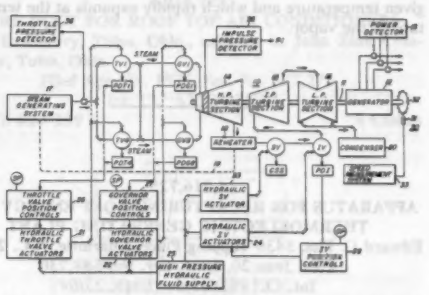
SPEED MEASUREMENT SYSTEM FOR TURBINE POWER PLANT

Earl T. Farley, Altamonte Springs, Fla., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Oct. 21, 1975, Ser. No. 624,351

Int. Cl.² F01K 13/02

U.S. Cl. 60—660 11 Claims



1. A system for controlling the operation of a power plant in accordance with selected criteria including rotational speed, comprising:

a turbine in which an elastic fluid imparts rotation to an output shaft;

valve means for controlling the flow of elastic fluid to the turbine;

means for generating displacement pulses as a function of incremental shaft rotation;

means governed by each generated displacement pulse to generate at least one additional pulse;

means to count each generated displacement pulse and additional pulse occurring during identical predetermined time intervals;

means to generate a binary representation in accordance with the total pulse count, said representation being a direct count of a shaft speed rate for a time interval greater than each said predetermined time interval, and

means including the binary representation to control the operation of the valve means.

4,016,724

STEAM ENGINE

Hans Ingemar Reimertz Karlsson, Vintervagen 17, Stockholm-Jarfalla, Sweden (S-175 40)

Filed Jan. 30, 1976, Ser. No. 653,829

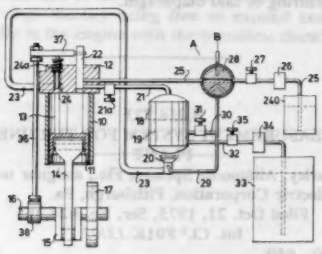
Claims priority, application Sweden, Jan. 31, 1975, 7501076

Int. Cl.² F01K 25/06

U.S. Cl. 60—672 15 Claims

1. A steam or vapor engine, comprising a vapor generating apparatus producing vapor of at least a given temperature; at least one cylinder with a member working in the cylinder; pipes and valves for supplying said vapor from the vapor generating apparatus to a closed chamber formed in the cylinder; pipes and valves for exhausting vapor from the cylinder chamber after a working stroke; and an apparatus for supply-

ing to said chamber substantially simultaneously with the vapor an additive which has a lower temperature than said



given temperature and which rapidly expands at the temperature of the vapor.

4,016,725

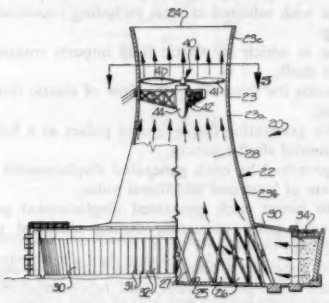
APPARATUS FOR RECAPTURING LOST ENERGY IN A THERMOELECTRIC GENERATING PLANT

Edward C. Fiss, 5436 Topping Place, Charlotte, N.C. 28209

Filed June 20, 1975, Ser. No. 588,730

Int. Cl.² F02C *1/04*; F01K *23/04*

U.S. Cl. 60—690 **5 Claims**



1. In a thermoelectric generating plant utilizing heat to generate electric energy and having a recirculating water system in which the water is heated during passage through the plant and must be cooled before recirculation to the plant thus causing a heat loss and resultant loss of energy; the combination therein of means for recapturing a portion of the normally lost energy comprising:

a natural air draft, cooling tower defining a generally vertically extending passageway for the flow of air therethrough from the bottom thereof to the top thereof and being disposed in said recirculating water system for receiving the heated water and passing the heated water through the flow of air at generally the bottom of said passageway for cooling the heated water and heating the air to cause a natural draft flow of air up through said passageway;

rotor means positioned in said passageway of said cooling tower for being rotated by the natural draft flow of air therethrough; and

electric generating means connected with said rotor means for being driven thereby to generate electric energy by the rotation of said rotor means and thus recapture a portion of the normally lost energy from said plant.

4,016,726

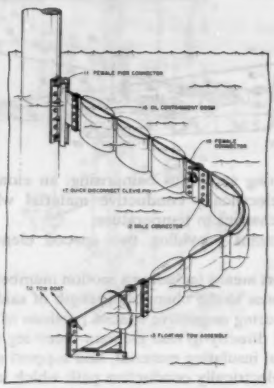
CONNECTOR HINGE FOR OIL CONTAINMENT BOOMS

Francis J. Campbell, Stanford, and Douglas J. Graham, San Francisco, both of Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Aug. 21, 1975, Ser. No. 606,696

Int. Cl.² E02B *15/04*

U.S. Cl. 61—1 F **16 Claims**



1. In combination with an oil spill containment boom, a connector hinge comprising:

a. a hollow cylindrical female portion tapered along its length and longitudinally attached to a first sheet member, said hollow cylindrical female portion having a slot extending along its longitudinal axis opposite said longitudinally attached first sheet member;

b. a hollow cylindrical male portion longitudinally attached to a second sheet member and formed to fit loosely within said hollow cylindrical female portion, said hollow cylindrical male portion having a slot extending along its longitudinal axis opposite said longitudinally attached second sheet member;

c. a resilient gasket disposed in said hollow cylindrical female portion and extending through said slot of said hollow cylindrical male portion, said resilient gasket positioned in said hollow cylindrical male portion to form an oil-tight seal between said hollow cylindrical female portion and said cylindrical male portion, said cylindrical male portion being disposed within said cylindrical female portion forming said connector hinge;

d. wherein said hollow cylindrical female portion is tapered to aid in disposition of said cylindrical male portion within said cylindrical female portion and formed with a cavity having a size which allows said male member to move freely along the length of the female portion thereby permitting said oil spill containment booms to follow tidal variations.

4,016,727

DRAIN TROUGH MEMBER AND ITS CONNECTOR

Tomikazu Osaka, and Morihisa Otsuka, both of Fukui, Japan, assignors to Fukui Chemical Industry Co., Ltd., Japan

Filed Mar. 4, 1975, Ser. No. 555,247

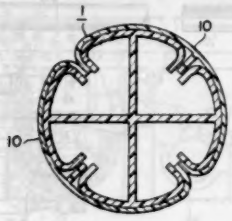
Claims priority, application Japan, Mar. 18, 1974, 49-031481[U]

Int. Cl.² E02B *11/00*

U.S. Cl. 61—11 **1 Claim**

1. A drain trough comprising, a plurality of longitudinally arranged plastic round pipes, each pipe having a plurality of

circumferentially spaced slits formed in an outer wall of the pipe and extending along a longitudinal direction of the pipe, and a plurality of plastic connectors of lesser longitudinal length than each of said pipes connecting next adjacent pipes and positioned circumferentially about circumferential portions of next adjacent pipes and each respectively having a cross-sectional shape of an arc of a circle and at least two ribs at the longitudinally extending ends of said connectors extending toward the center of the arc, each pipe having a partition wall within and extending continuously from an end of the pipe to its other end along a longitudinal direction of the pipe to divide in cross section an inside space of the pipe into



several circumferentially spaced, longitudinally extending independent compartments, said partition wall having longitudinally extending portions integrally attached to inside wall portions of the plastic round pipe, each pipe additionally having longitudinally extending straps at the longitudinally extending edges of the slits extending inwardly of the pipe, wherein at least one connector is attached to the side walls of end portions of two pipes connected therewith, said ribs of the connector are firmly inserted into the slits, and the number of slits in a cross section of the outer wall of the pipe being equal to the number of the compartments formed in the pipe and communicating with a corresponding compartment.

4,016,728

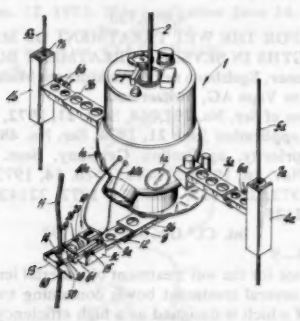
DEVICE FOR SEVERING UNDERWATER CABLES

Burton Hoster Mason, P.O. Box 504, Covington, La. 70433

Filed Nov. 19, 1975, Ser. No. 633,549

Int. Cl.² B63C *11/00*; B26B *3/00*

U.S. Cl. 61—69 R **29 Claims**



1. A device to sever cables comprising, a body having a first end portion, a second end portion opposed thereto and a pair of spaced opposed side portions being disposed between said first and second end portions, one side portion interconnecting said end portions and the other side portion being connected to the first end portion and spaced from the second end portion, means adaptably formed with said first end portion to attach said device to a horizontally rotatable arm so as to provide circumferential travel to said device, a pair of parallel opposed facing blade track means, each of said track means being formed with one each of said side portions, blade means being horizontally disposed in said body and facing said second end portion and being formed with a pair of blade guide means for slidable engagement with respective track means so that said blade means is movable from said first end portion to said second end portion, and blade drive means adaptably mounted to said body at said first end and interconnected to said blade means to drive said blade means from said first end portion to said second end portion and cable passage means being integrally formed with a vertically disposed face of said second end portion and a vertically disposed face of said other side portion spaced from said second end portion to permit passage of a vertically disposed cable upon circumferential travel of said device towards said cable, said cable being positioned within the body of said device between said opposed end and side portions.

4,016,729

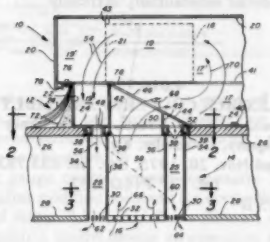
CURB-DUCT FOR ROOF TOP AIR CONDITIONERS

Louis E. Cherry, Tulsa, Okla., assignor to John Zink Company, Tulsa, Okla.

Filed Apr. 28, 1975, Ser. No. 572,272

Int. Cl.² A25D *23/12*

U.S. Cl. 62—259 **8 Claims**



1. An air conditioning system adapted to receive and supply conditioned air from a roof top mounting opening to ceiling of a room below, comprising:

a. a rectangular shallow pan divided into two contiguous chambers one surrounding the other, means for sealable mounting said pan on said roof top, each of said chambers having at least one opening in the bottom thereof, the two opening together matching said mounting opening in said roof, conduit means extending from said chambers to said ceiling of said room;

b. means associated with said pan for supporting and fastening said air conditioning system to the top of said pan;

c. ceiling fixture means in said room, including air inlet means and air outlet means and including means to connect to each of said air inlet and outlet means one of said conduit means.

4,016,730

REFRIGERATORS

Paul Hendrik DeVilliers, 224 Anderson St., Pretoria, South Africa

Filed Jan. 31, 1975, Ser. No. 546,142

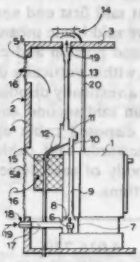
Claims priority, application South Africa, Feb. 5, 1974, 74/0741

Int. Cl.² F23B *15/00*; F23L *17/02*

U.S. Cl. 62—476 **12 Claims**

1. An absorber type refrigerator having a burner means adapted to burn a fuel with air, which comprises shielding means adapted to substantially totally enclose the burner means to inhibit adverse effects of draughts upon the burner means, a flue leading upwards from the shielding means and having an upper exit to the ambient air provided with means adapted to produce a reduction of pressure from the ambient

air, inlet connection means adapted to provide access for the ambient air to the interior of the shielding means, and means at the entrance of the inlet connection means adapted to prevent any reduction of pressure from the ambient air to the interior of the inlet connection means in draughty conditions



of the ambient air, in which the means adapted to prevent pressure reduction at the entrance to the inlet connection means comprises at least one flat plate centrally spanning the interior of the connection means and projecting out of the entrance of the connection means into the ambient air, said plate being oriented substantially vertically.

4,016,731

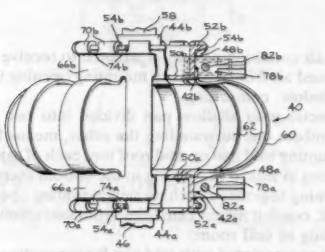
FLEXIBLE COUPLING ASSEMBLY

Charles F. Foushee, Fern Creek, Ky., assignor to General Electric Company, Louisville, Ky.

Filed Nov. 20, 1975, Ser. No. 633,783

Int. Cl.² F16D *3/52*

U.S. Cl. 64—15 B **4 Claims**



1. A flexible coupling assembly for connecting a driving member to a driven member comprising:

a. a first circular end plate for attachment to the driving member for rotation therewith,

b. a second circular end plate spaced from the first end plate for attachment to the driven member for rotation therewith, said first and second end plates each having a circular flat surface and at least one lug extending beyond the flat surface,

c. a one-piece flexible plastic molded body having (i) a collar portion at each end engaging the circular flat surface of the first and second end plates respectively, said collar portions each having two bosses for receiving fastening means to secure the collars to the first and second end plates respectively, (ii) a notched area to receive the respective lugs, and (iii) a plurality of spaced outwardly bowed ribs interconnecting the collar portions and spanning the space between the first and second end plates, and

d. fastening means holding the two bosses of each collar portion together to thereby secure the molded body to the first and second end plates.

4,016,732

FILAMENT MONITORING DEVICE

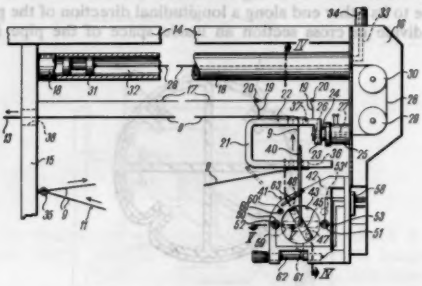
Eberhard Merkle, Stuttgart, Germany, assignor to Wilh. Bleyle KG, Stuttgart, Germany

Filed July 18, 1975, Ser. No. 597,148

Claims priority, application Germany, Aug. 7, 1974, 2438006

Int. Cl.² D04B *35/12*

U.S. Cl. 66—163 **9 Claims**



1. A filament monitoring device for a knitwear manufacturing machine having an energizable drive drive therefore, the device comprising a filament guide for conducting a filament therethrough and arranged to be guided out of an operating position thereof when a predetermined filament tension is exceeded thereby causing the machine drive to be deenergized, a compressed air cylinder, a return piston reciprocable in said cylinder and arranged to return the filament guide into said operating position in such a manner as not to break the filament, means for automatically reenergizing the machine drive when said filament guide has been returned into said operating position, a slide member, a tie member connecting said slide member to said piston, means for guiding said slide member into and out of said operating position and magnet means including an armature for holding said slide member in said operating position when said filament tension is below a predetermined value, said slide member carrying only said filament guide and said armature.

4,016,733

DEVICE FOR THE WET TREATMENT OF MATERIAL LENGTHS IN SEVERAL TREATMENT BOWLS

Heinz Fleissner, Egelsbach near Frankfurt am Main, Germany, assignor to Vepa AG, Switzerland

Continuation of Ser. No. 291,064, Sept. 21, 1972, abandoned. This application June 21, 1974, Ser. No. 481,831

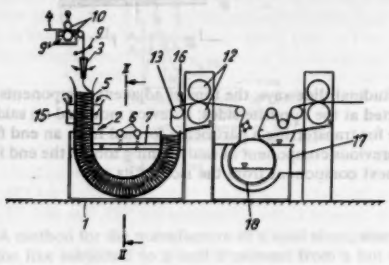
Claims priority, application Germany, Sept. 21, 1971, 2146990; Nov. 16, 1971, 2156765; Feb. 14, 1972, 2206872; Feb. 21, 1972, 2208053; Mar. 24, 1972, 2214267; May 5, 1972, 2222125

Int. Cl.² D06B *3/02, 21/00*

U.S. Cl. 68—9 **32 Claims**

1. A device for the wet treatment of material lengths, which comprises several treatment bowls containing treatment liquids one of which is designed as a high efficiency wash bowl with a bowl preceding said high efficiency wash bowl serving as a plain steeping bowl through which the material passes slowly and in a folded state through a treatment liquid; a perforated drum wash bowl being used as the high efficiency wash bowl and a J-box positioned within another bowl being employed as a steeping bowl; said J-box having a knee portion, a long intake leg portion, and a delivery leg portion, the knee portion being located in said another bowl which is filled with a treatment liquid up to a certain level; said J-box also having upper and lower curved walls which are surrounded by the another bowl and the clearance between the walls being con-

stant with said curved walls also being liquid-permeable; means being provided for wetting the material length with liquid located in front of a means for plaiting said material; said plaiting means acting to plait the material length into the long intake leg of the J-box in folds which completely fill the clearance between the upper and lower J-box walls, until a certain height of material is reached and consequently a certain weight of material pile has been achieved, the weight being sufficient so that the resulting material pile is automatically pushed throught he knee portion of the J-box and out above the liquid level in the delivery leg to a dripping height;



and a drawoff roller installed immediately above at an opening for material delivery from the J-box; said means for wetting the material length including a spraying assembly arranged in front of the plaiting means with fresh water pipes arranged to spray liquid onto both sides of the material length and a drain socket which is directly connected with a waste water channel; said spraying assembly including also a container having several deflector rollers therein, each of said rollers being followed by a squeeze unit including rollers and near which said fresh water sparay pipes are arranged at both sides of the material.

4,016,734

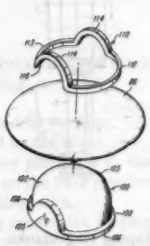
SAFETY HELMET WITH INDIVIDUALIZED HEAD-CONTOURED INTER-LINER

William G. Morton, 22 Rue Royale, Kettering, Ohio 45429

Division of Ser. No. 570,712, April 23, 1975, which is a continuation-in-part of Ser. No. 360,950, May 16, 1973, Pat. No. 3,882,546, which is a continuation-in-part of Ser. No. 323,195, Jan. 12, 1973. This application June 14, 1976, Ser. No. 695,793

Int. Cl.² C14B *1/00*

U.S. Cl. 69—8 **3 Claims**



1. A device for stretching a piece of leather to form a cap-like headpiece liner for a safety helmet, comprising a first mold member having a dome-shaped mold surface, means forming a shoulder projecting outwardly from the base of said mold surface, said shoulder having a pair of upwardly projecting U-shaped portions on opposite sides of said mold surface, a second mold member having an annular mold surface conforming generally to the contour of said shoulder of said first mold member, and said first mold member cooperates with said second mold member to stretch said piece of leather for providing said liner with a dome-shaped head covering portion and a base flange portion projecting outwardly from said head covering portion.

4,016,735

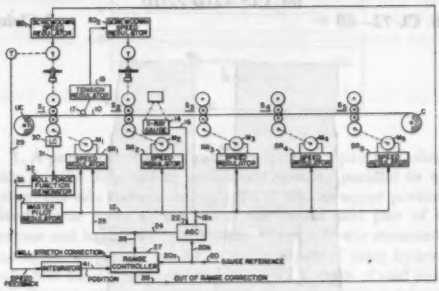
RANGE CONTROL FOR AN AUTOMATIC GAUGE CONTROL SYSTEM OF A ROLLING MILL

Robert S. Peterson, Williamsville, N.Y., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Sept. 23, 1975, Ser. No. 616,109

Int. Cl.² B21B *37/06*

U.S. Cl. 72—9 **2 Claims**



1. In a system for controlling the gauge of strip material issuing from a rolling mill having at least one first rollstand driven at a predetermined rolling speed with a predetermined roll gap; the combination of:

automatic gauge control means responsive to strip gauge sensed after said first rollstand for controlling the feeding speed of material into said first rollstand, said automatic gauge control means having an operative range;

range control means responsive to an out-of-range condition of said automatic gauge conrol means for generating a range correction signal; and

means for altering the roll gap of said first rollstand in relation to said range correction signal, thereby to eliminate said out-of-range condition and enable operation of said automatic gauge control means within said operative range.

4,016,736

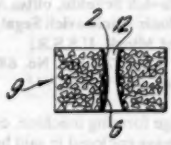
LUBRICANT PACKED WIRE DRAWING DIES

Lynn Cloyd Carrison, Columbus, and Robert George Wetzel, Chesterland, both of Ohio, assignors to General Electric Company, Columbus, Ohio

Filed June 25, 1975, Ser. No. 590,155

Int. Cl.² B21C *3/02, 9/00*

U.S. Cl. 72—41 **18 Claims**



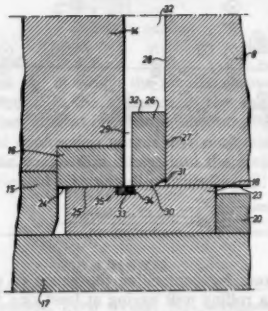
1. A wire drawing die comprising a mass having a centrally-located double tapered hole extending therethrough with micro-rough walls having pores, said mass comprising predominately a material selected from the group consisting of compacted polycrystalline diamond, compacted polycrystalline cubic boron nitride and mixtures thereof, wherein said mass has been compacted at a pressure of at least about 40

kilobars, and wherein substantially only the pores which are exposed at the surface of said micro-rough walls in said hole are densely packed with a lubricant for wire drawing.

4,016,737
HIGH PRESSURE PRESS

Sven-Göran Gustafsson; Hans Gunnar Larsson; Kjell Lilja, all of Vasteras; Bertil Lundback; Jan Nilsson, both of Robertsfors, and Pertti Syvakari, Helsingborg, all of Sweden, assignors to Allmanna Svenska Elektriska Aktiebolaget, Vasteras, Sweden

Filed Dec. 11, 1975, Ser. No. 639,830
Claims priority, application Sweden, Dec. 6, 1974, 7415296
Int. Cl.² B21D *22/10*
U.S. Cl. 72—60 **3 Claims**



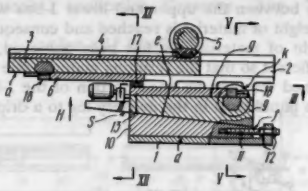
1. Press for hydrostatic extrusion having a press chamber to enclose a pressure medium, which press chamber is formed of a high pressure cylinder, a pressure generating piston, a die and a die support and seals, in which there is a metallic sealing ring in the high pressure cylinder, the outer cylindrical surface of said metallic sealing ring making contact with the cylinder and one end surface of said sealing ring making contact with the die support, the die support having a groove in the end surface, said groove being concentric with the sealing ring and having an outer diameter of at least the same size as the inner diameter of said metallic sealing ring making contact with the die support outside the groove when the container is closed, and a sealing ring in said groove abutting the inner edge of the metallic sealing ring at the end in contact with the die support.

4,016,738
TRAVERSE WEDGE FORMING MACHINE

Alexandr Vladimirovich Puchko, ulitsa Sedykh, 64, kv. 2; Valery Alexandrovich Klushin, ulitsa Prityts kogo, 52, kv. 25; Georgy Vasilievich Andreev, ulitsa Orlovskaya, 81, kv. 51; Eduard Matveevich Gorbunov, ulitsa Koltsova, 26, kv. 111; Evgeny Markellovich Makushok, ulitsa Sovetskaya, 2, kv. 3; Valery Yakovlevich Schukin, ulitsa Akademicheskaya, 11a, kv. 7, and Vladimir Mironovich Segal, ulitsa V.Khoruzhei, 35, kv. 74, all of Minsk, U.S.S.R.

Filed Apr. 27, 1976, Ser. No. 680,810
Int. Cl.² B21H *7/18*
U.S. Cl. 72—90 **11 Claims**

1. A transverse wedge forming machine, comprising a housing; longitudinal slideways enclosed in said housing; a movable plate mounted in said longitudinal slideways; a fixed plate mounted in said housing for movement towards said movable plate and parallel thereto; two wedge-shaped forming tools mounted concordantly to said longitudinal slideways; one of said forming tools being arranged on said movable plate, each of said tools comprising components having tool tops and end faces, one tool top being directed toward movement the transfer of said movable plate during the forming operation; the other one of said forming tools being mounted on said fixed plate, its top being directed toward the side opposite to the direction of the first forming tool; a clearance between said forming tools to receive a part being formed; said components being disposed in a single row in a direction normal to said

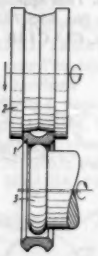


longitudinal slideways; the tops of adjacent components being directed at the opposite sides; a device mounted on said fixed plate for transferring a part being formed from an end face of the previous component of said forming tool to the end face of the next component from the side of its top.

4,016,739
METHOD OF SHAPING RING BLANKS

Vladimir Viktorovich Lapin, ulitsa Khlopina 7, korpus 2, kv. 18, Leningrad; Boris Sergeevich Bulgakov, ulitsa Sharikopodshipnikovaya 36/18, kv. 291, Moscow; Konstantin Nikolaevich Bogoyavlensky, ulitsa Khlopina 7, korpus 2, kv. 12, Leningrad; Jury Lvovich Rozhdestvensky, Ierusalimsky proezd 4, kv. 12, Moscow; Simon Pavlovich Granosky, Volzhsky bulvar 30, kv. 39, Moscow; Genrikh Semenovich Maizelis, Leninsky prospekt 90, kv. 176, Moscow; Vladimir Ivanovich Lazutin, ulitsa Zoologicheskaya 30, kv. 3, Moscow, and Ilya Alexandrovich Sauskan, ulitsa 7 Parkovaya 33, korpus 1, kv. 27, Moscow, all of U.S.S.R.

Filed Dec. 8, 1975, Ser. No. 638,975
Int. Cl.² B21H *1/12*
U.S. Cl. 72—105 **4 Claims**

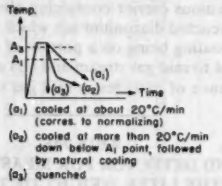


1. A method of shaping ring blanks, such as raceways, to produce a ring blank or raceway having fibers which bend around the race and having a prescribed profile for the inner cylindrical surface thereof, comprising the step of: reducing the initial ring blank on two sides with the aid of deforming tools, the initial ring blank having a plain cylindrical inner surface and a preprofiled outer surface so selected that the outer profile is substantially identical to said prescribed inner profile, and said deforming tools being so selected that the plain cylindrical inner surface of the ring blank is acted upon by a tool having said prescribed profile whereas the outer surface of the blank is acted upon by a plain tool.

4,016,740
METHOD AND AN APPARATUS FOR THE MANUFACTURE OF A STEEL SHEET

Hisashi Gondo; Hiroshi Takechi; Tsuyoshi Kawano, all of Kisarazu; Hiroaki Masui, and Kazuo Kovama, both of Kimitsu, all of Japan, assignors to Nippon Steel Corporation, Tokyo, Japan

Continuation of Ser. No. 428,825, Dec. 27, 1973, abandoned. This application Aug. 22, 1975, Ser. No. 606,783
Int. Cl.² B21B 9/00
U.S. Cl. 72—128 16 Claims

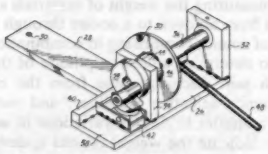


1. A method for the manufacture of a steel sheet, steel strip and the like subjected to a heat treatment from a hot rolled coil, said sheet having a thickness of as low as 1.2 mm and as high as 12.7 mm which comprises uncoiling the hot rolled coil, heating said uncoiled strip at temperatures below 1300° C., subjecting the same to a forced cooling down to temperatures below the A_1 point at a cooling rate of at least 20° C/min., and positively imparting a stress upon said strip during the heat treatment.

4,016,741
BRACELET DOMER

Spencer B. Sitter, Rte. 3, Box 86N, Santa Fe, N. Mex. 87501

Filed Dec. 29, 1975, Ser. No. 644,633
Int. Cl.² B21D 17/02, 22/02
U.S. Cl. 72—415 16 Claims



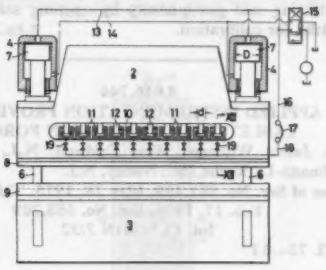
1. A machine to form a domed bracelet from a flat ductile metal blank comprising:

a. a base,
b. a lever connected to the base,
c. a pin connected to the lever,
d. a convex hammer journaled to the pin on the lever,
e. a concave anvil on the base positioned so that the convex hammer mates therewith,
f. said lever being means for forcing the convex hammer against the concave anvil in mating relationship,
g. both hammer and anvil having a toroidal surface,
h. each of said toroidal surfaces having a minor chord and a major circle,
j. with clearance between the two surfaces at least as great as the thickness of the blank,
k. the crank pin parallel to the minor chord of both of the toroidal surfaces of the dies, and
m. the convex hammer moving through a path which is in the same plane of the major circle of both toroidal surfaces.

4,016,742
PRESS-FORMING APPARATUS

Seiji Shiokawa, 110-6 Matsumoto, Mishima, Shizuoka, Japan

Filed Sept. 15, 1975, Ser. No. 613,310
Int. Cl.² B21D 5/02
U.S. Cl. 72—465 3 Claims

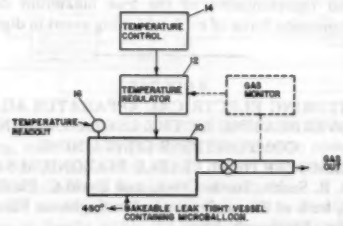


1. A press-forming apparatus comprising a pair of C-shaped side frames disposed at a constant spacing parallel to each other, the side frames having a lower and an upper portion, a fixed frame fixed to the lower portion of said pair of side frames and having an upper surface, a female die mounted on the upper surface of the fixed frame, a pair of main hydraulic cylinders fixedly mounted on the upper portion of said pair of side frames, the main hydraulic cylinders having a piston, a movable frame supported above the fixed frame by the pistons of the pair of main hydraulic cylinders and having a lower surface, a male die mounted on the lower surface of the movable frame, a space in the movable frame adjacent and along the lower surface thereof, a plurality of deflection cylinders mounted in the space and arranged in a row, each deflection cylinder having a ram, the total cross sectional area of the rams of the deflection cylinders being substantially the same as that of the pistons of the pair of main hydraulic cylinders, and means for connecting the fluid paths of the main hydraulic cylinders with the fluid paths of the deflection cylinders whereby the fluid paths are in communication.

4,016,743
VARIABLE LEAK GAS SOURCE

Timothy M. Henderson, and Gilbert H. Wuttke, both of Ann Arbor, Mich., assignors to KMS Fusion, Inc., Ann Arbor, Mich.

Filed Oct. 4, 1974, Ser. No. 513,332
Int. Cl.² G01D 21/00
U.S. Cl. 73—1 R 3 Claims



3. A method of obtaining a variable calibrated leak source of gas which comprises:

a. storing at a predetemined temperature a quantity of hollow, glass, gas-filled, microspheres ranging in size from 10 to 300 micrometers in a confined chamber having a controlled outlet, said gas having the characteristic of permeating through glass and being present in said spheres in a predetermined and known quantity,

b. heating said chamber and said contained spheres above said predetermined temperature to cause the egress of gas by permeation through the walls of said microspheres into said chamber,

c. controlling the heating temperature of said chamber to control the quantity of gas discharging from said spheres, and

d. utilizing said gas quantity by opening said controlled outlet for calibration.

4,016,744

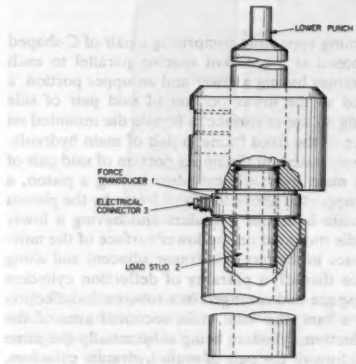
APPLIED INSTRUMENTATION PROVIDING TABLETTING COMPRESSION FORCE

Joseph James Williams, West Caldwell, N.J., assignor to Hoffmann-La Roche Inc., Nutley, N.J.

Division of Ser. No. 581,459, May 28, 1975. This application Feb. 17, 1976, Ser. No. 658,209

Int. Cl.² G01N *3/32*

U.S. Cl. 73—11 **11 Claims**



1. An arrangement for deriving in digital form the true maximum compression force developed in a tablet press for each tabletting event comprising:

means, mounted on a portion of the press experiencing the compression force developed during tabletting, for generating a first signal representative of the compression force developed by the press for each tabletting event;

means for deriving from said first signal a second signal representative of the true maximum compression force developed for each tabletting event; and

means coupled to said deriving means for providing the signal representative of the true maximum developed compression force of each tabletting event in digital form.

4,016,745

MONITORING ELECTRICAL APPARATUS AGAINST OVERHEATING BY THE USE OF COATING COMPOSITIONS CONTAINING THERMOPARTICULATABLE DIAZONIUM SALTS

James D. B. Smith, Turtle Creek, and David C. Phillips, Pittsburgh, both of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Division of Ser. No. 568,224, April 15, 1975, Pat. No. 3,979,353. This application June 1, 1976, Ser. No. 691,682

Int. Cl.² C08K *5/01*; C08L *63/00*; G01N *7/00*

U.S. Cl. 73—19 **34 Claims**

1. A method of protecting electrical apparatus from damage due to overheating and for thereafter determining the location of said overheating, said apparatus including a gas stream and a monitor for detecting particles in said gas stream and for emitting a signal when said particles are detected comprising:

A. preparing a composition which comprises about 20 to about 250 phr of at least one diazonium salt solid and stable at 50° C and a solution of a resinous carrier curable and stable at 60° C and unreactive with said diazonium salt;

B. applying said composition to said electrical apparatus at positions exposed to said gas stream;

C. evaporating said solvent and curing said resinous carrier; and,

D. monitoring said gas stream for the presence of particles therein.

22. A thermal detection system for electrical apparatus cooled by a gas stream comprising (A) a coating of a solid layer of a resinous carrier containing about 20 to about 250 phr of an unreacted diazonium salt which is solid and stable at 50° C, said coating being on a portion of said electrical apparatus exposed to said gas stream and (B) a monitor for detecting the presence of particles in said gas stream.

4,016,746

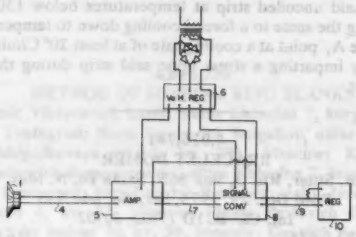
SYSTEM AND DETECTOR FOR MEASURING BY MEANS OF SOUND THE LITER WEIGHT OF THE MATERIAL IN SATELLITE COOLERS FOR ROTATIVE OVENS

Ricardo Paredes-Galvan, Escobedo sur 733, Ste. 201, Monterrey, Nuevo Leon, Mexico

Filed July 28, 1975, Ser. No. 599,885

Int. Cl.² G01N *9/00*

U.S. Cl. 73—32 R **4 Claims**



1. A system measuring the weight of materials such as clinkers which pass from an oven to a cooler through a discharge pipe by means of sound, comprising in combination, a microphone placed to determine sound amplitude of the materials passing through said discharge pipe from the oven to the cooler, a frequency selective amplifier, and output means coupled to the amplifier to display variations in sound amplitude to thereby indicate the weight of said materials.

4,016,747

METHOD OF AND APPARATUS FOR CHECKING THE CYLINDRICITY OF A TEST SURFACE

Hristo Kirilov Radev, Sofia, Bulgaria, assignor to VMEI "Lenin" -NIS, Sofia, Bulgaria

Filed Mar. 17, 1976, Ser. No. 667,547

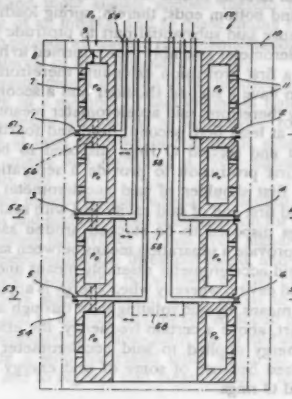
Claims priority, application Bulgaria, Mar. 17, 1975, 29338

Int. Cl.² G01B *13/16, 13/19*

U.S. Cl. 73—37.9 **5 Claims**

1. In an apparatus for checking the deviation from cylindricity of each of a plurality of axially spaced cross-sectional locations of a test surface of a first cylinder having a means axis, a hollow cylindrical second cylinder having a reference surface complementary to the test surface of the first cylinder, the reference surface exhibiting a plurality of circumferentially spaced apertures extending into the hollow interior of the second cylinder, the apertures in the reference surface being symmetrically distributed about the axis of the second cylinder, means communicating with the interior of the second cylinder for propelling an air stream symmetrically out of the apertures of the reference surface to support the second cylinder coaxially with the mean axis of the first cylinder with

the reference surface in confronting relation with the test surface, a plurality of distance sensing means, means for supporting the sensing means in axial spaced relation along the second cylinder to indicate the instantaneous distance between each sensing means and the confronting portion of the test surface, and means for individually adjusting the radial position of each of the sensing means with respect to the axis of the second cylinder.



4,016,748

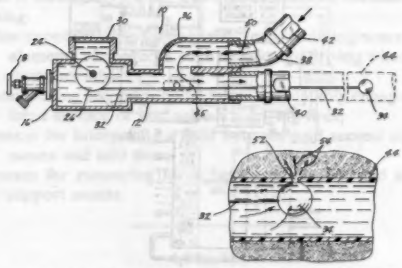
PIPELINE AND LEAK LOCATER AND METHOD

Virgil C. Boyens, R.R. 1, Denison, Iowa 51442

Filed Nov. 10, 1975, Ser. No. 630,694

Int. Cl.² G01M *3/28*

U.S. Cl. 73—40.5 R **11 Claims**



1. A method of detecting a leak in a conduit, said method comprising;

flowing a fluid through said conduit at super-atmospheric pressure,

placing within said conduit a floatable leak sensor which is responsive to pressure, velocity and turbulence differentials caused by a leak in said conduit,

moving said leak sensor through said conduit along with said fluid, said floatable leak sensor automatically stopping movement through said conduit at the location of a leak in said conduit.

4,016,749

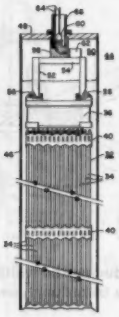
METHOD AND APPARATUS FOR INSPECTION OF NUCLEAR FUEL RODS

William J. Wachter, R.D. 1, English Road, Wexford, Pa. 15090

Continuation of Ser. No. 376,697, July 5, 1973, abandoned. This application July 14, 1975, Ser. No. 595,577

Int. Cl.² G01M *3/04*

U.S. Cl. 73—45.5 **19 Claims**



1. A method of detecting defects in nuclear fuel rods immersed in a liquid, said fuel rods containing fuel pellets and a fluid, said method comprising the steps of inducing a change in the relative pressures of said liquid and said fluid, and detecting mechanical vibration of said fuel rods induced by emission into the liquid of material expelled from a rod.

4,016,750

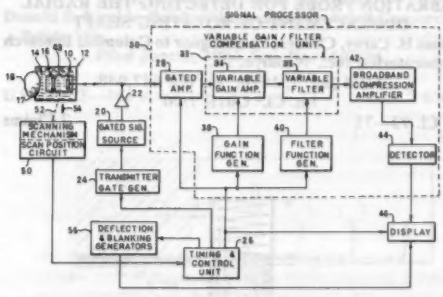
ULTRASONIC IMAGING METHOD AND APPARATUS

Philip S. Green, Atherton, Calif., assignor to Stanford Research Institute, Menlo Park, Calif.

Filed Nov. 6, 1975, Ser. No. 629,594

Int. Cl.² G01N *29/00*

U.S. Cl. 73—67.5 R **18 Claims**



1. In an ultrasonic system for the examination of the interior of objects, such as body parts, the combination comprising,

means for insonification of an object under examination with a broadband ultrasonic wave signal,

means for receiving echo signals from discontinuities over a range of depths within the insonified object and for converting the same to electrical signals,

means for filtering said electrical signals by bandpass filter means having a filter transmission factor as a function of frequency which is variable, and

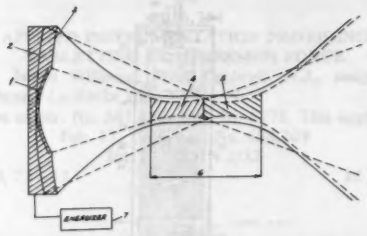
means for compensating for depth dependent changes in the spectral distribution of the echo signals by time varying the filter transmission factor versus frequency characteristic of the bandpass filter means in accordance with the depth of the discontinuity from which the echo signal is reflected.

4,016,751

ULTRASONIC BEAM FORMING TECHNIQUE

George Kossoff, Northbridge, Australia, assignor to The Commonwealth of Australia Care of the Department of Health, Phillip, Australia

Continuation-in-part of Ser. No. 397,004, Sept. 13, 1973, abandoned. This application Sept. 29, 1975, Ser. No. 617,980
Int. Cl.² G01N *29/00*
U.S. Cl. 73—71.5 US **3 Claims**



1. Apparatus for reducing the width of a beam of ultrasonic energy, generated by a transducer, over an extended distance, comprising:

means for focusing a first portion of said beam at a first distance from said transducer; and

means for simultaneously focusing at least one additional portion of said beam, coaxial with said first portion, at a distance from said transducer different from said first distance;

whereby a coaxial composite beam having a multi-curved converging wavefront is produced and said energy is concentrated in a line of focus;

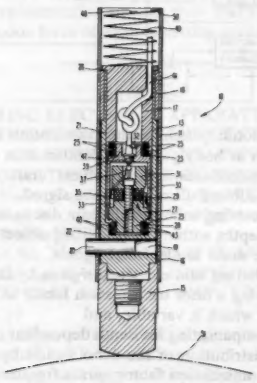
wherein said means for focusing the portions of said beam at different distances from the transducer comprise a multi-curved surface on said transducer.

4,016,752

VIBRATION PROBE FOR DETECTING THE RADIAL DISPLACEMENT OF ROTATING SHAFT

Thomas H. Carey, Chester, Pa., assignor to Columbia Research Laboratories, Inc., Woodlyn, Pa.

Filed Jan. 7, 1976, Ser. No. 647,048
Int. Cl.² G01H *1/00*
U.S. Cl. 73—71 **2 Claims**



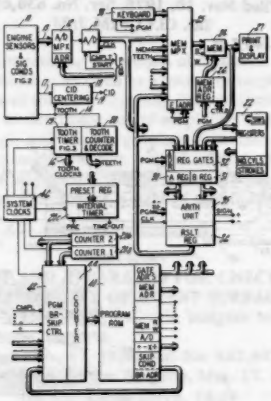
1. A vibration probe for detecting the radial displacement of a rotating shaft comprising in combination: a hollow sleeve member having first and second ends; main housing means disposed within said hollow sleeve member and formed to have a substantial part protruding from said first end of said hollow sleeve member to come in contact with said rotating shaft, said main housing means further formed to have a cavity, with top and bottom ends, therein; spring loading means disposed to cause said substantial part to protrude from said first end; accelerometer assembly means formed to have a first shoulder and a first protrusion extending therefrom and further formed to have a second shoulder and a second protrusion extending therefrom; said accelerometer means disposed in said cavity; at least first, second, third and fourth O rings, with said first and second O rings disposed to be stacked around said first protrusion to provide a seperation means between said first shoulder of said accelerometer assembly means and said first end of said cavity and with said third and fourth O rings disposed to be stacked around said second protrusion to provide a separation means between said second shoulder of said accelerometer assembly means and said second end of said cavity, whereby when energy is applied to said main housing means, by said rotating shaft through moving the protruding part, above a certain frequency, the effective frequency of energy applied to said accelerometer assembly means is altered because of some of said energy being absorbed by said O rings.

4,016,753

SUB-CYCLIC SPEED AND CYCLIC TIME MEASUREMENTS FOR INTERNAL COMBUSTION ENGINE HORSEPOWER INDICATION

James F. Willenbecher, East Windsor; Philip P. Stick, Enfield, and Rinaldo R. Tedeschi, Newington, all of Conn., assignors to United Technologies Corporation, Hartford, Conn.

Filed May 7, 1976, Ser. No. 684,219
Int. Cl.² G01L *5/26*
U.S. Cl. 73—116 **4 Claims**



1. Apparatus for providing indications of speed of an internal combustion engine at two points in time spaced across a significant portion of an acceleration profile of the engine while accelerating, together with an accurate measure of the elapsed time between the two speed measurements, comprising:

means for registering an indication of a threshold speed, above which measurements relating to acceleration of the engine may be made and for presenting a threshold manifestation indicative thereof:

speed sensing means, adapted to be disposed for response to a mechanical rotation of a portion of the engine through successive known angles which are a small fraction of a

full revolution of the engine, for successively providing measured data manifestations of the time elapsed during angular revolution of the engine through said known angles;

an interval timer operative in response to start and stop command input signals applied thereto to commence timing of an interval and to cease timing of an interval, and to provide an elapsed time manifestation indicative of the interval of time measured thereby;

cycle sensing means adapted to be disposed for response to motion of a member of said engine in timed relation to the cycles of said engine as said engine rotates through angles at least an order of magnitude greater than said small angles and providing a cycle signal in response thereto; and

processing means responsive to said measured data manifestations and said threshold manifestation for sensing a first succeeding occurrence of said cycle signal after the engine speed equals the threshold speed, and responsive to said first succeeding occurrence of said cycle signal to provide a start command input signal to said interval timer and to register said measured speed manifestation, and responsive to a subsequent one of said cycle signals to provide a stop command input signal to said interval timer and to register said measured data manifestation.

4,016,754

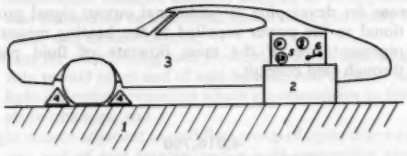
TESTING DEVICE FOR WHEELED AUTOMOTIVE VEHICLES

John W. Wiss, 3316 Brookdale Drive, Pittsburgh, Pa. 15241

Continuation-in-part of Ser. No. 280,865, Aug. 15, 1972, Pat. No. 3,826,129. This application July 30, 1974, Ser. No. 493,168

Int. Cl.² G01M *15/00*

U.S. Cl. 73—117.3 **17 Claims**



1. A testing device for wheeled automotive vehicles comprising:

first support means for engaging and restraining nonrotating elements of a vehicle, such as axle, nondriving wheel, and frame members;

nonrotating second support means for slidably engaging the tread surface of said vehicle's driving tires;

means for interposing a fluid between said second support means and said tires;

means for measuring force between said first and second support means.

4,016,755

METHOD AND DEVICE FOR DYNAMICALLY MEASURING BRAKE FORCES

Paul-Henry Botvid Anderberg, Hollviksnas; Hans Gunnar Günther Hambitzer, Lund, and Nils Börje Lennart Sander, Malmo, all of Sweden, assignors to Svenska Aktiebolaget Bromsregulator, Malmo, Sweden

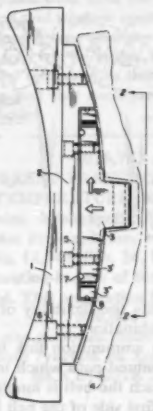
Filed Aug. 26, 1975, Ser. No. 607,811

Claims priority, application Sweden, Sept. 6, 1974, 7411284

Int. Cl.² G01L *5/28*

U.S. Cl. 73—121 **2 Claims**

1. Dynamic brake force measuring means comprising in combination, a brake mechanism including a braking block and a braking friction material for contacting a rotating member preferably a railway wheel, a measuring part immovably affixed to said braking block at selected positions with said measuring part having at least two elastically deformable sections extending from the affixed positions responsive to deform respectively to brake forces transmitted thereto by said braking friction material through said braking block in different coordinate directions signifying radial and tangential brake forces, separate strain gauge means affixed respectively to said two deformable sections for reading out separately the



forces appearing in said different coordinate directions dynamically during the braking operation thereby to derive separate radial and tangential brake forces at different speeds and loads and braking forces, and directional force transmitting members respectively bearing on both said two deformable sections and braking block in said coordinate directions to transmit dynamic braking forces between said braking block and said measuring part deformable sections.

4,016,756

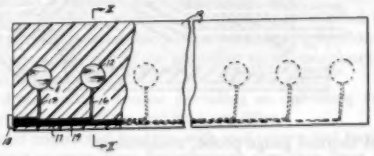
NIP LOAD SENSING DEVICE

Donald E. Kunkle, Beloit, Wis., assignor to Beloit Corporation, Beloit, Wis.

Filed June 8, 1972, Ser. No. 260,806

Int. Cl.² G01L *5/16*

U.S. Cl. 73—141 A **7 Claims**



1. A mechanism for measuring nip load between opposed pressure rolls comprising in combination,

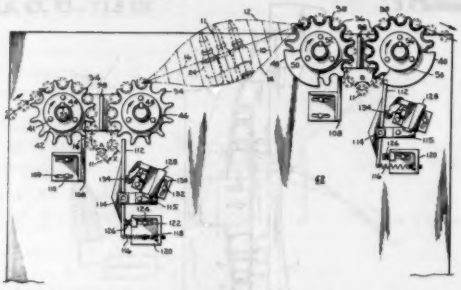
an elongate thin straight load sensing bar having a length to be coextensive with a nip to be tested, said bar being of substantially uniform thickness along its length,

a plurality of spaced load sensing cells embedded in said bar at spaced locations aligned with each other in a straight line so as to be centered in the nip with the bar centered between the rolls forming the nip and having an electrical characteristic which is a function of the stress on the bar across the nip, and electrical leads connected to each of the load sensing cells for connection to an indicator means for indicating the change in said electrical characteristic so that the nip load can be determined at each said locations along the nip at a predetermined overall force between rolls.

4,016,757
APPARATUS FOR TESTING FLEXIBILITY OF AMMUNITION LINK BELTS

Vincent R. Elliott, Raytown, Mo., assignor to Remington Arms Company, Inc., Bridgeport, Conn.

Filed Nov. 5, 1975, Ser. No. 629,142
Int. Cl.² G01M 13/00
U.S. Cl. 73—167 11 Claims



1. Apparatus for testing the flexibility of ammunition link belts, comprising in combination:

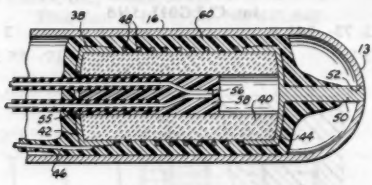
means for feeding an ammunition link belt longitudinally through a predetermined path which includes a first dependent loop in which the belt is longitudinally reversed in direction with a first side of the belt facing the outside of said first loop, a span in which the belt is twisted about its longitudinal axis, and a second dependent loop in which the belt is longitudinally reversed in direction with a second side of the belt facing the outside of said second loop;

and sensor means constructed and arranged for detecting enlargement of either of said loops from a normal size, incident upon feeding through said loops of relatively inflexible portions of the belt.

4,016,758
THERMAL GAUGE PROBE

Julian S. Taylor, 8300 SW. 8, Oklahoma City, Okla. 73108

Filed Sept. 9, 1975, Ser. No. 611,755
Int. Cl.² G01F 1/68
U.S. Cl. 73—204 8 Claims



1. A thermal gauge probe, comprising:

an elongated tubular stem having a closed end portion, said stem being adapted to be inserted at its closed end portion into a fluid stream contained by a wall;

a resistance heater coil axially disposed within said stem and connected with a source of electrical energy supplying a constant voltage of preselected value to said heater coil;

a thermocouple within said stem and having its junction axially disposed within said resistance heater coil; and

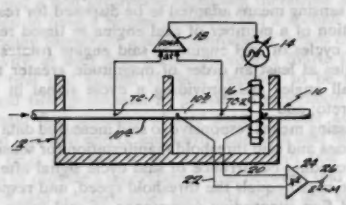
tubelike electrical nonconducting material surrounding the thermocouple junction and supporting said heater coil in spaced relation with respect to the inner wall surface of said stem,

whereby the electromotive force generated by said thermocouple in response to the temperature of said heater coil is inversely proportional to the rate of heat dissipation from the outer surface area of said stem to the surrounding fluid.

4,016,759
FLUID FLOWMETER

William C. Baker, Hampton, and John J. Chapman, Virginia Beach, both of Va., assignors to Teledyne, Inc., Los Angeles, Calif.

Filed Sept. 18, 1975, Ser. No. 614,654
Int. Cl.² G01F 1/68
U.S. Cl. 73—204 21 Claims



1. Apparatus for measuring fluid flow, comprising:

at least one conduit through which fluid passes;

a heat sink through which said conduit projects, said heat sink including a partition for separating said conduit into first and second conduit portions;

means for heating said first portion of the conduit, said heat sink preventing the second portion of the conduit from being heated when said first portion is heated;

means joined to the exterior of said conduit at said first and second conduit portions for sensing the temperature of the conduit at said portions and for producing output signals representative of the temperatures sensed;

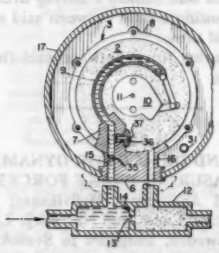
means responsive to said output signals produced by the temperature sensing means for varying power supplied to said heating means in order to maintain a constant difference in temperature between two of said sensing means; and

means for developing an additional output signal proportional to the power supplied to the heating means and representative of the mass flowrate of fluid passing through said conduit.

4,016,760
DIFFERENTIAL FLOWMETER

Thomas D. Taylor, Roanoke, Va., assignor to Graham-White Manufacturing Co., Salem, Va.

Filed Dec. 17, 1975, Ser. No. 641,825
Int. Cl.² G01F 1/34
U.S. Cl. 73—205 R 7 Claims



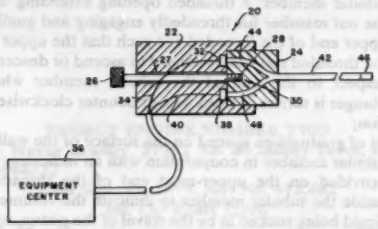
1. A differential flowmeter comprising a fluid-tight casing, a pressure chamber contained in said casing, an element sealed in said chamber and expansible and contractible in response to differentials in internal and external pressures thereon, said element internally and said chamber being separately connected to a fluid line on opposite sides of a restriction therein for receiving line fluid therefrom and therethrough applying directly to said element different pressures in said line up-

stream and downstream of said restriction, and an equalizing valve in said pressure chamber between said chamber and the upstream connection of the pressure responsive element to the fluid line for limiting the differential pressures on the element to a predetermined maximum.

4,016,761
OPTICAL TEMPERATURE PROBE

Thomas C. Rozzell, Annandale, Va.; Curtis Johnson, Sanda, Utah; Carl Durney, and James Lords, both of Salt Lake City, Utah, assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Apr. 18, 1974, Ser. No. 461,834
Int. Cl.² G01K *11/12*; G01J *5/60*
U.S. Cl. 73—356 **11 Claims**

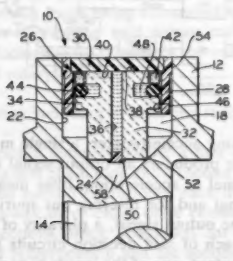


1. A temperature probe which is adapted to be implanted in a material whose temperature is to be measured comprising:
an optic fiber bundle having first and second groups of optic fibers which are physically separated at one end of said bundle;
a temperature sensitive element adapted to be implanted in said material to be measured and in close proximity to the other end of said bundle;
means for maintaining said element in an airtight relationship to said other end of said bundle, said element having light reflective properties which are responsive to temperature changes; and
light source adjacent to said first group of optic fibers at said one end of said bundle, and a light responsive element adjacent the second group of optic fibers at said one end of said bundle.

4,016,762
TEMPERATURE INDICATOR

William J. Payne, Greensburg, Pa., assignor to Modulus Corporation, Chagrin Falls, Ohio

Filed Sept. 2, 1975, Ser. No. 609,374
Int. Cl.² G01K *11/12*
U.S. Cl. 73—358 **12 Claims**

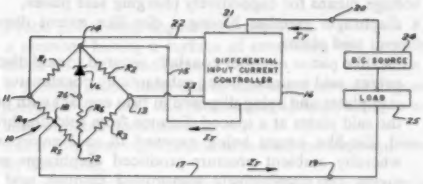


1. A temperature indicator comprising:
a first member subject to temperature fluctuations and having a head with a recess extending into said head;
a fluid holding member having a window and disposed within said recess such that said window is visible;
an indicator area and a light-absorbing indicator fluid disposed in said fluid holding member;
said indicator area being separated from said window with at least a portion of said fluid disposed between said indicator area and said window;
means to drain said fluid from the space between said indicator area and said window upon the reaching of a predetermined temperature; whereby
said indicator area will be visible through said window at a predetermined temperature thereby giving a visual indication of the fact that such predetermined temperature has been reached.

4,016,763
TWO WIRE CURRENT TRANSMITTER RESPONSIVE TO A RESISTIVE TEMPERATURE SENSOR INPUT SIGNAL

Earl A. Grindheim, Minneapolis, Minn., assignor to Rosemount Inc., Eden Prairie, Minn.

Division of Ser. No. 14,748, Feb. 24, 1970, Pat. No. 3,859,594, which is a continuation-in-part of Ser. No. 661,988, Aug. 21, 1967, abandoned. This application Sept. 27, 1974, Ser. No. 510,026
Disclosure was also published under second Trial Voluntary Protest Program on Apr. 13, 1976
Int. Cl.² G01K *7/24*
U.S. Cl. 73—362 AR **11 Claims**

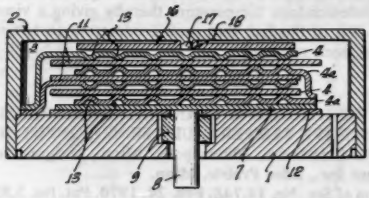


1. A resistance-to-current converter system comprising:
a. a sensing resistor responsive to a variable physical condition to be indicated,
b. a bridge including said resistor, said bridge having input and output junctions and being balanced only when said resistor has a predetermined value, whereby the bridge voltage developed at said output junctions is a function of the deviation of the resistor from said predetermined value as a result of a change in said physical condition,
c. a D-C amplifier whose input circuit is connected to the output junctions of said bridge whereby the impedance in the output circuit of the amplifier varies as a function of said bridge voltage,
d. a direct-voltage source providing an operating voltage both for said bridge and said amplifier,
e. a load connected in series with said source and having an output current flow therethrough resulting from variations in said resistor and hence indicative of said condition,
f. a voltage regulator,
g. a pair of wires connecting said series-connected source and load through said regulator across both the output circuit of said amplifier and the input junctions of said bridge, whereby the operating voltage of said amplifier is stabilized despite variations in said output current flow through said load resulting from variations in the value of said resistor,
h. a feedback resistor connected in series with said load to produce a feedback voltage, and
i. means to feed said feedback voltage into the arm of said bridge containing said sensing resistor in series opposition to the voltage produced by the sensing resistor to rebalance the bridge, whereby the output current is accurately proportional to changes in said resistor.

4,016,764
TEMPERATURE COMPENSATED, HIGH RESOLUTION PRESSURE TRANSDUCER BASED ON CAPACITANCE CHANGE PRINCIPLES

John H. Rice, Cumberland, Md., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed July 19, 1976, Ser. No. 706,657
Int. Cl.² G01L *9/12*
U.S. Cl. 73—398 C **12 Claims**

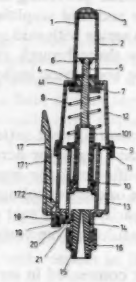


1. Capacitive transducer apparatus for measuring and sensing ambient environmental pressure variations comprising:
- a plurality of disc-like capacitor plates disposed a spaced distance one from the other,
- resilient means associated with said plates for yieldably maintaining said spaced distance,
- a dielectric substance within said space,
- voltage means for capacitively charging said plates,
- a diaphragm member having a disc-like extent disposed over said plates,
- a disc-like piston member coaxially secured to said disc-like extent, said member being substantially coextensive with said plates and being disposed in firm contact with one of the said plates at a spaced distance from said diaphragm,
- said disc-like extent being exposed to said environment whereby ambient pressure-produced diaphragm movements are distributively transmitted through said load piston to uniformly move said plates and vary their capacitance, and
- capacitance output means.

4,016,765
PIPETTE CONTROLLER WITH GRADUATE READING PLUNGER

Tsao-Pino Lee, No. 89-1, Chang Chun Road, 2nd Fl., Taipei, China /Taiwan (104)

Filed May 7, 1976, Ser. No. 684,258
Int. Cl.² B01L *3/02*; G01N *1/14*
U.S. Cl. 73—425.6 **10 Claims**



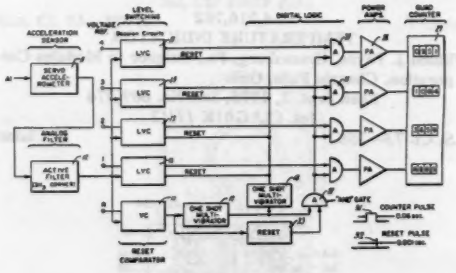
6. A pipette controller comprising:
- a cylinder having, at its base, a first port provided with a rubber seal and a collet for tightly connecting with the mouthpiece of a pipette inserted therein, and a second port communicating with the atmosphere via a channel;
- a cap member of substantially U-shaped vertical section coaxially mounted on the upper end of the cylinder;
- a piston capable of reciprocation inside the cylinder; and
- a threaded rod having one end connected to the piston and the other end threadedly connected with a plunger assembly extending through an opening on the top of the cap member, said plunger assembly having a radial flange on the lower end thereof and a coiled spring biasing said flange against the inner upper side of said cap member, said spring wound around the threaded rod between said flange and said cylinder for normally maintaning the upper end of the plunger assembly projected outside the cap member and providing restoring force therefor;

said plunger assembly including:
- a hollow tubular member of transparent material;
- a lid closing the upper end of the tubular member;
- a nut member fixedly connected to the lower end of the tubular member, a threaded opening extending through the nut member for threadedly engaging and guiding the upper end of the threaded rod such that the upper end of the threaded rod will be caused to ascend or descend with respect to the wall of the tubular member when the plunger is turned in clockwise or counter clockwise direction;
- a set of graduations spaced on the surface of the wall of the tubular member in cooperation with an indicating means provided on the upper-most end of the threaded rod inside the tubular member to indicate the volume of the liquid being sucked in by the travel of the piston, whereby the volume of the liquid to be pipetted may be preset by turning the plunger to have the indicating means coincide with a selected one of the graduation lines; and
- an operable lever assembly connected to close said channel for controlling the natural drainage of the liquid from the inserted pipette.

4,016,766
COUNTING ACCELEROMETER APPARATUS

Harold D. Morris, Orinda, Calif., assignor to Systron Donner Corporation, Concord, Calif.

Continuation of Ser. No. 137,209, April 26, 1971, abandoned, which is a continuation-in-part of Ser. No. 841,271, July 14, 1969, abandoned. This application Nov. 30, 1973, Ser. No. 420,537
Int. Cl.² G01P *15/08*
U.S. Cl. 73—517 R **27 Claims**



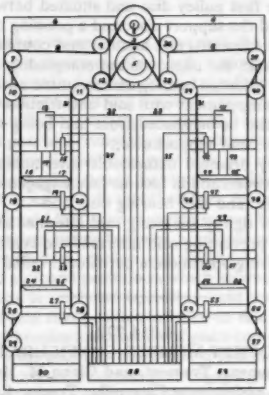
1. In a counting accelerometer, a single means for sensing acceleration for producing an output signal substantially linearly proportional to acceleration, filter means for receiving the output signal and for filtering out spurious information contained in the output signal, a plurality of electronic decision circuits, each of said decision circuits having a pair of inputs and an output, one of the inputs in each of the decision circuits being coupled to the output of the filtering means, a reference for each of said decision circuits connected to the other input of the respective decision circuit, said references having different values, counting means for registering each

time each decision circuit makes a determination that the output signal from the single means for sensing acceleration exceeds each reference, and means for causing delayed resetting of each of the decision circuits after the information carried by the decision circuits has been registered in the counting means, said means for causing delayed resetting for each of the decision circuits including means for preventing the resetting of the decision circuit after the output signal of the means for sensing acceleration has reached a value greater than a predetermined reference value until the output signal of the means for sensing acceleration returns to a value less than the predetermined reference value.

4,016,767
ENERGY ENGINE NUMBER TWO

Robert Wayne Bradley, 27751 No. 46 Sidney Drive, Euclid, Ohio 44132

Filed Sept. 11, 1975, Ser. No. 612,482
Int. Cl.² F16H *21/16*
U.S. Cl. 74—25 4 Claims



1. A device for converting reciprocal motion to rotary motion comprising,

first and second continuous loops of chain,

each of said chain loops being connected to rotary means,

means inter-connecting said rotary means for unitary output including means to reverse the output direction of one of said rotary means,

input means,

said input means including at least one reciprocating member,

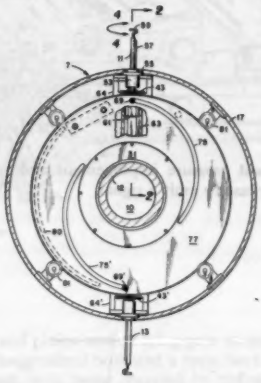
each reciprocating member having a first driving connection with the first chain loop and a second driving connection with the second chain loop, each drive connection being a one-way drive chain drive connection; said first drive connections being positioned for driving in one direction of reciprocation and the second drive connections being positioned for driving in the opposite direction of rotation,

whereby reciprocating motion is converted to rotary motion during both directions of reciprocation.

4,016,768
TRAVERSING PROBE SYSTEM

Douglas N. Mashburn, Knoxville; Richard H. Stevens, Oak Ridge, and Harold C. Woodall, Kingston, all of Tenn., assignors to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed Mar. 15, 1976, Ser. No. 667,005
Int. Cl.² F16H *21/00*
U.S. Cl. 74—23 10 Claims



1. Probe positioning apparatus comprising:

a. a member having a surface of revolution and rotatable about an axis of the same;

b. a sensing probe mounted to said member and disposed normal to said axis, said probe being slidable along its axis and rotatable about its axis.

c. a first ring gear rigidly secured to said member and coaxial therewith,

d. a second ring gear rotatably supported by said member and coaxial therewith,

e. means coupling said second ring gear and said probe, for rotating said probe about its axis when said second ring gear is rotated,

f. a cam plate rotatably supported by said member and coupled to said probe, for imparting slidable movement to said probe when said member is rotated relative to said cam plate,

g. first drive means for rotating said first ring gear, and

h. second drive means for rotating said second ring gear.

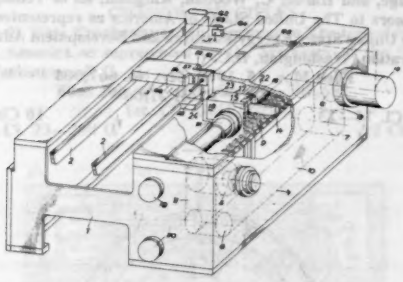
4,016,769
INDEXING DRIVE FOR TRANSFER LINES

Gerhard Fröschle, Kongen, Germany, assignor to Cross Europa-Werk GmbH, Wendlingen, Germany

Filed Jan. 16, 1975, Ser. No. 541,570
Int. Cl.² F16H *19/06*
U.S. Cl. 74—37 6 Claims

1. In an indexing drive for transfer lines of the type having a timed-bar driver supported for reciprocating movement on a frame and couplable to at least one timed-bar, a longitudinally displaceable drive element driven by a drive source substantially parallel to the plane of movement of the timed bar, means supporting said drive element for linear reciprocating movement, means continuously coupling the drive element to the timed-bar driver, at least two associated surfaces at said coupling means, said surfaces extending transversely to the direction of said reciprocating movement, connecting means constantly and sealingly pressing said surfaces together, means

causing a medium under pressure to impinge on said surfaces at their plane of contact, and a sensing device continuously



monitoring said pressure impingement and responsive to a pressure decrease to emit a signal.

4,016,770

PULLEY ASSEMBLY

Edward W. Enters, Fredonia, Wis., assignor to Gilson Bros. Co., Plymouth, Wis.

Filed Nov. 3, 1975, Ser. No. 628,188

Int. Cl.² F16H *55/54, 55/36;* **F16B** *2/02;* **B25G** *3/20*

U.S. Cl. 74—230.3 **9 Claims**

1. In an assembly of a pulley and shaft and a coupling between the pulley and shaft, the improvement in which the coupling comprises a clamp having radially deformable jaws embracing said shaft and a jaw actuator for moving said jaws toward said shaft to clamp the pulley to the shaft, said clamp having a keyhole-shaped shaft-receiving opening, said clamp having free-ended levers extending transversely from the jaws and to which said jaw actuator is connected.

4,016,771

MOUNTING FOR A CONE PULLEY TRANSMISSION

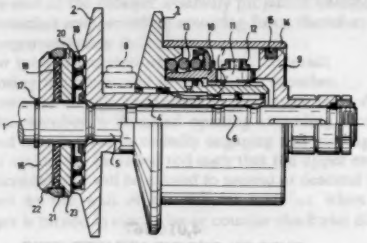
Heinrich Berens, Bad Homburg, and Stefan Füle, Bad Nauheim, both of Germany, assignors to P.I.V. Antrieb Werner Reimers Kommanditgesellschaft, Bad Homburg, Germany

Filed Sept. 29, 1975, Ser. No. 617,708

Claims priority, application Germany, Oct. 9, 1974, 2449819

Int. Cl. F16h *11/06, 55/56;* **F16c** *27/00*

U.S. Cl. 74—230.17 M **7 Claims**



1. In a mounting for a cone pulley transmission that includes a shaft; a first and a second pulley disc axially slidably mounted on the shaft; means coupling the first pulley disc to the second pulley disc for rotation in unison with respect to the shaft; a support disc axially fixedly mounted on the shaft; an axial anti-friction bearing mounted on the shaft in engagement with the first pulley disc and situated between the first pulley disc and the support disc; and a pressing device urging the pulley discs towards one another and coupling the pulley discs to the shaft; the improvement comprising

a. a radially oriented bearing disc mounted on said shaft and being in engagement with said anti-friction bearing; said bearing disc being spaced from and being movable with respect to, said support disc;

b. a radially oriented deformable intermediate layer disposed between and in face-to-face engagement with, said suppot disc and said bearing disc; and

c. means for tightly enclosing said intermediate layer at all sides for preventing said intermediate layer from undergoing, during operation, a permanent radial deformation.

4,016,772

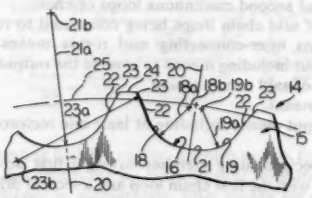
SPROCKET MEMBER CONFIGURATION

Donald E. Clemens, Tremont, and Glenn M. Haslett, Peoria, both of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed Sept. 22, 1975, Ser. No. 615,446

Int. Cl.² F16H *55/30;* **B62D** *55/08*

U.S. Cl. 74—243 R **10 Claims**



1. In a chain drive sprocket member having a plurality of teeth defining a pitch circle having a radius of approximately 20 inches, an improved pocket configuration between said teeth having opposite flank surfaces at opposite sides of the pocket radial centerline each defined by a pocket radius centered on a point spaced radially inwardly of said pitch circle

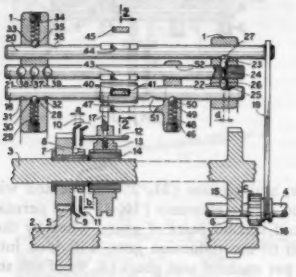
and spaced circumferentially from said pocket radial centerline, and an arcuate root surface defined by a radius centered on a point on said pocket radial centerline and spaced outwardly of said pitch circle.

4,016,773

SYNCHRONIZED GEARBOXES HAVING AT LEAST ONE NON-SYNCHRONIZED SPEED

Jacques Galas, Puteaux, and Daniel Marie, Conflans, both of France, assignors to Automobiles Peugeot, Paris and Regie Nationale des Usines Renault, Boulogne-Billancourt, both of, France

Filed Feb. 21, 1975, Ser. No. 551,687
Claims priority, application France, Mar. 6, 1974, 74.07565
Int. Cl.² F16H *3/22, 3/16*
U.S. Cl. 74—333 6 Claims



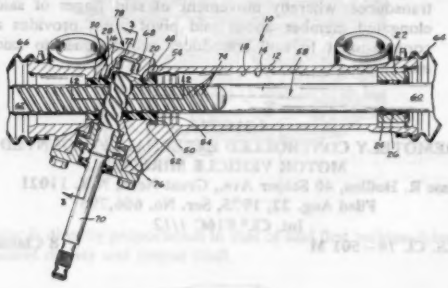
1. In a gearbox comprising a case and the following elements mounted in the case: a first shaft, a second shaft, at least one set of synchronized gears comprising a first gear rotatably mounted on said first shaft and a second gear integral with said second shaft, a first movable gear engaging means combined with said first gear and comprising a synchronizer for synchronizing the rotation of said first gear with the rotation of said first shaft and coupling means for coupling said first gear with said first shaft to rotate with said first shaft, first shifting means combined with said first gear engaging means for shifting said first gear engaging means between a neutral position, a first position in which first position said synchronizer is rendered operative and a second position in which second position said coupling means is rendered operative, said second position being beyond said first position relative to said neutral position, an unsynchronized second set of gears comprising a third gear integral with said first shaft and a fourth gear integral with said second shaft, a second gear engaging means cooperative with said second set of gears and comprising a rotatable gear pinion capable of being shifted to an operative position of engagement between said third and fourth gears, and second shifting means combined with said second gear engaging means for shifting said gear pinion to said operative position; the improvement comprising intermediate means movably mounted on said first shifting means, selector means capable of cooperating simultaneously with said second shifting means and said intermediate means, releasable means for fixing said intermediate means to said first shifting means, said selector means being capable of shifting said first shifting means through the agency of said intermediate means a sufficient extent to cause said first gear engaging means to move from said neutral to said first position substantially before said selector means has shifted said gear pinion to said operative position through the agency of said second shifting means, and means for releasing said releasable means when said first gear engaging means have reached said first position and thereby precluding further movement of said first gear engaging means while said selector means continues to shift said gear pinion into said operative position through the agency of said second shifting means, said selector means being capable of cooperating solely with said first shifting means to the exclusion of said intermedite means and said second shifting means when it is desired to engage said first set of gears.

4,016,774

RACK AND PINION STEERING GEAR

Donald J. Baker, and Robert W. Jackson, both of South Bend, Ind., assignors to The Bendix Corporation, South Bend, Ind.

Filed Dec. 19, 1975, Ser. No. 642,290
Int. Cl.² F16H *1/18, 19/04, 1/04;* B62D *1/20*
U.S. Cl. 74—424.6 16 Claims



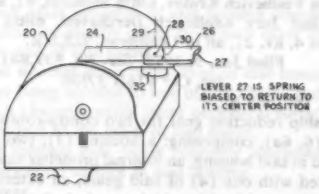
1. In a rack and pinion and steering gear assembly, a housing defining a longitudinal bore and a cross bore therewithin, said longitudinal bore being stepped to define larger and smaller sections with a shoulder therebetween, said cross bore intersecting said longitudinal bore at the smaller diameter section of the latter, a pinion rotatably mounted in said cross bore at the intersection of the latter with said longitudinal bore, a rack slidably supported in said longitudinal bore by said smaller section of the latter, and meshing with said pinion, an annular bearing member located in the smaller portion of the longitudinal bore for supporting said rack, said annular bearing having an opening for receiving said pinion, and resilient means acting against said bearing means to yieldably urge the latter and therefore said rack toward said pinion, whereby the bias exerted by said resilient means against said annular bearing yieldably maintains said rack in meshing engagement with said pinion.

4,016,775

FINGER ACTUATED CONTROLLER

E. Frank Carlson, Maple Valley, Wash., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed July 11, 1974, Ser. No. 487,697
Int. Cl.² G05G *9/00*
U.S. Cl. 74—471 XY 3 Claims



1. In an aircraft having a control lever controlling a throttle control, said control lever having a top portion knob-shaped for easy grasping by a pilot of the aircraft, the addition of a control device comprising:

a support arm having at least two sides and positioned along a longitudinal axis mounted at one end of said top portion and extending away therefrom;

a finger-operated elongated member pivotally mounted

near one end thereof about a pivot point on said support arm and positioned along the same longitudinal axis as said support arm;

centering means connected to said finger-operated member for automatically returning it to said pivot point after said member has been moved about said pivot point to either side of said support arm, said finger-operated member having a free end which is arcuate-shaped to comfortably receive the finger of a pilot;

a position transducer located beneath said support arm;

linking means connecting said elongated member with said transducer, whereby movement of said finger of said elongated member about said pivot point provides a control input to said transducer proportional to said movement.

4,016,776

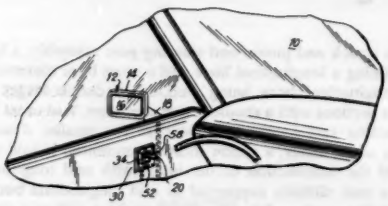
REMOTELY CONTROLLED EXTERNALLY MOUNTED MOTOR VEHICLE MIRROR

Jesse R. Hollins, 40 Stoner Ave., Great Neck, N.Y. 11021

Filed Aug. 22, 1975, Ser. No. 606,795

Int. Cl.² F16C *1/12*

U.S. Cl. 74—501 M **8 Claims**



1. An improved remotely controlled externally mounted motor vehicle mirror comprising a motor vehicle, a door adjacent to where the driver of the motor vehicle sits, a mirror assembly including a mirror affixed to the outside of said door, means stationary with said door for selectively adjusting the position of said mirror including a member, and means for placing said selective adjusting means in a desired reference position including means for limiting the movement of said member in a vertical and horizontal direction whereby said mirror can be placed in a desired reference position.

4,016,777

SHIP REDUCTION GEAR FOR CONTRAROTATING SCREWS

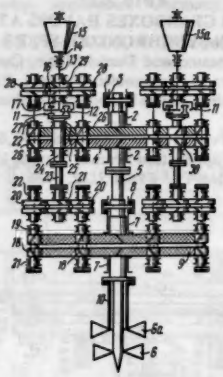
Nikolai Stepanovich Ryzhkov, ulitsa L. Golikova, 4, kv. 152; Viktor Petrovich Nikolaev, prospekt Stachek, 216, kv. 8; Viktor Alexeevich Krylov, ulitsa Khrustitskogo, 110, kv. 31; Leonid Yakovlevich Ioffe, ulitsa Gogolya, 21, kv. 26; Veniamin Vasilievich Krotov, ulitsa Stoikosti, 41, korpus 1, kv. 175, and Jury Adolfovich Derzhavets, ulitsa Orbeli, 25, korpus 4, kv. 27, all of Leningrad, U.S.S.R.

Filed Jan. 9, 1975, Ser. No. 539,841

Int. Cl.² F16H *37/06*

U.S. Cl. 74—665 K **2 Claims**

1. A ship reduction gear for two contra-rotating propeller screws (**6**, **6***a*), comprising: a housing (**1**); two gears (**4**, **9**) arranged in said housing; an internal propeller shaft (**5**) rigidly connected with one (**4**) of said gears; an external propeller shaft (**10**) coaxial with said internal shaft and rigidly connected with the other (**9**) of said gears; said shafts carrying the screws and serving as the output elements of the ship reduction gear; at least one differential (**11**) installed in said housing and including a driving element (**12**) which is the input element of the ship reduction gear, and two driven elements (**16**, **17**); kinematic chains (**29** to **26** and **21** to **18**), respectively connecting said driven elements with said gears (**4**, **9**), each of said kinematic chains including first two pairs of gears (**18**, **26**) permanently meshing with respective ones of said gears (**4**, **9**) of the shafts, second two pairs of gears (**20**, **28**), two shafts (**19**, **27**), said first pairs of gears being fitted on one of their ends, and said second pairs of gears being fitted on their



other ends, and pinions (**21**, **29**) connected with respective ones of said driven elements (**16**, **17**) and permanently meshing with said second pairs of gears; whereby the power flow transmitted to the reduction gear is divided into four flows, two flows per each of said gears (**4**, **9**) of the shafts (**5**, **10**).

4,016,778

WORM DRIVE HYDRAULIC AUTOMATIC TRANSMISSION

John W. von Greyerz, 55 W. Rahn Road, Dayton, Ohio 45429

Filed Apr. 4, 1975, Ser. No. 564,875

Int. Cl.² F16H *47/04*

U.S. Cl. 74—687 **3 Claims**

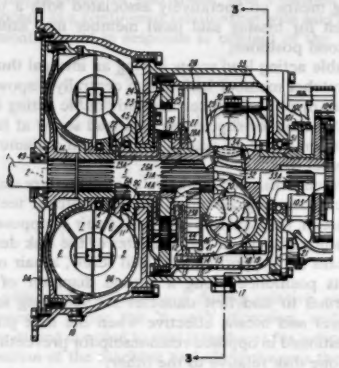
1. A fluid-driven worm drive automatic transmission capable of providing low motor to drive wheel ratios and substantially reducing differential gear reductions and having as distinct operational units a fluid drive torque converter, a hydraulically driven and controlled worm drive unit and a gear box unit, said transmission including an output shaft driven by said fluid-controlled worm drive unit and turbine-driven first planetary gear system with connected carrier and associated engine driven primary pump attached thereto at one end, and a primary pump-driven second planetary gear system with carrier and connected oil pump having an annulus gear attached at the other end of said output shaft in a position adjacent to said torque converter, thereby providing a base for driving at least two pinion gears, said pinion gears causing rotation of a sun gear of said second planetary gear system and its attached oil pump at a speed faster than that of said driven first planetary carrier and associated primary pump during operation thereof, whereby:

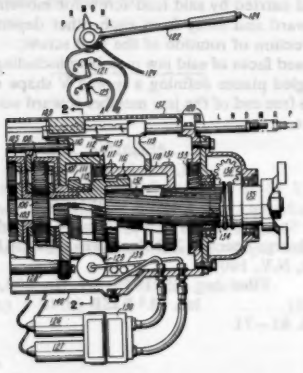
the rotational speed of said sun gear of said second planetary gear system and its connected oil pump is directly proportional to the rotational speed of both said driven first planet carrier and said output shaft;

the torque required to drive said first planetary gears and oil pump is applied to said output shaft by said second planetary annulus gear and output shaft return housing; and

said second planetary gear system drives its oil pump with added speed during acceleration and wherein said second planetary gear system is connected to a rotatable pump hub having retractable vanes within an ellipsoid-shaped housing having an intake chamber and an exhaust chamber at each end of said ellipsoid to provide dual intake

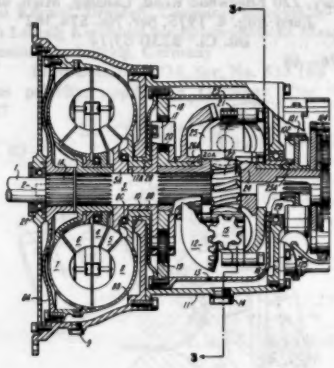
and exhaust areas each of which has connected thereto an oil motor with appropriate connecting feedlines, said oil





pump housing, oil feedlines and oil motors being connected to said first planet worm carrier.

ciated engine-driven primary pump, whereby the speed of rotation of said sun gear and its connected worm drive ring



gear is directly proportional to that of said first turbine-driven planet carrier and output shaft.

4,016,779

WORM DRIVE AUTOMATIC TRANSMISSION

John W. von Greyerz, 55 W. Rahn Road, Dayton, Ohio 45429

Filed Apr. 4, 1975, Ser. No. 564,877
Int. Cl.² F16H *37/06*
U.S. Cl. 74—724 5 Claims

1. A mechanically-driven worm drive transmission capable of responding to changed load conditions while providing low motor to drive wheel ratios, said transmission having an internal worm drive output shaft connected at one end to a mechanically gear-driven worm drive unit through a first turbine-driven planetary gear system having a carrier connected to and driven by the turbine of a torque converter and at the other end a second planetary gear system having a carrier driven by the primary pump of said torque converter and annulus gear providing a base, adjacent to said torque converter, for driving at least two associated pinion gears which in turn rotate a sun gear and separate worm driven ring gear, whereby the speed of rotation of said latter two gears exceeds that of both said driven second planet carrier and its asso-

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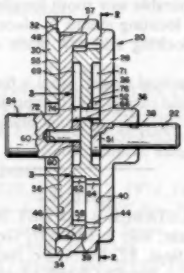
4,016,780

HYPOTROCHOIDAL CLUSTER GEAR DRIVES

Sandor J. Baranyi, Ithaca, N.Y., assignor to Trocholdal Gear Technology, Inc., Ithaca, N.Y.

Filed Mar. 3, 1975, Ser. No. 554,903
Int. Cl.² F16H *1/28*
U.S. Cl. 74—804 10 Claims

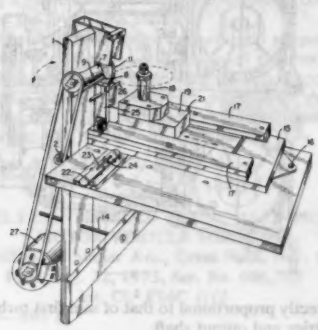


1. A gear unit comprising
a housing,
two axially-aligned shafts, both of which are journaled in said housing,
two internal gears mounted in said housing coaxially with said shafts, and slightly offset from each other along the common axis of said shafts,
one of said internal gears being fixed in said housing, and the other being secured to one of said shafts, and having thereon a circumferential outer peripheral surface,
a crank secured to the other of said shafts,
said other internal gear being rotatably journaled on its outer peripheral surface in said housing,
a cluster gear,
said cluster gear comprising two externally-toothed gears of different diameters, respectively, one of which meshes with said fixed internal gear and the other of which meshes with said other internal gear,
said cluster gears being coaxial but having their common axis parallel to but offset from the axis of said shafts, and
a crank pin secured to said crank coaxially with said cluster gear and connecting said crank to said cluster gear.

4,016,781
DEVICE FOR GUMMING AND SHARPENING CIRCLE SAWS

Alex Dudley, 220 Edgewood Road, Lansing, Mich. 48910

Filed Aug. 4, 1975, Ser. No. 574,362
Int. Cl.² B23D 63/14
U.S. Cl. 76—40 3 Claims



3. A circular saw blade sharpening apparatus comprising, in combination, a vertical rocker panel with a rotatable drive shaft carrying a cutting disc; a motor for powering said drive shaft; a rocker arm on which said vertical panel is balanced; means for securing said panel against further progress toward saw holding structure, in cooperating means with,

a. a saw blade supporting structure comprising an elongated base table, means for securing said table to a bench; ways allowing a block carrying a saw holding arbor to travel to and from said vertical panel, means for securing the travel of said block at a desired point,

b. manually operable saw tooth locating means, means for locking said locating means in place,

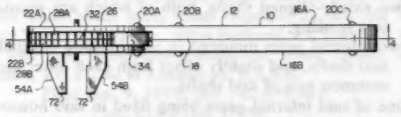
c. means for locking said saw blade on said saw holding arbor,

wherein said vertical rocker panel is freely balanced on said rocker arm and carries said cutting disc in close proximity to a horizontally disposed saw blade that is freely rotatable on said saw holding arbor.

4,016,782
ADJUSTABLE RATCHET WRENCH

Henry L. Guimarin, Rte. 3, Box 337, Grapevine, Tex. 76051

Filed Sept. 12, 1975, Ser. No. 612,949
Int. Cl.² B25B 13/46
U.S. Cl. 81—63 1 Claim



1. An improved adjustable ratchet wrench comprising:

a body formed of two complementary side pieces and defining an elongated handle portion and two parallel, spaced apart members each terminating in a generally circular enlarged ratchet holding head;

a circular ratchet member having a plurality of ratchet teeth about its periphery and hub portions of reduced diameter extending from opposing sides;

each of said ratchet holding heads including co-axial circular openings receiving one of the hub portions of said ratchet member and supporting said ratchet member for rotation;

a generally triangular shaped pawl member mounted between said spread apart members and pivotal between first and second positions in which first and second abutments selectively engage said ratchet teeth to selectively control the direction in which said ratchet member can be rotated;

spring means co-operatively associated with a third abutment for biasing said pawl member into said first and second positions;

a double acting lead screw having an intergal thumb wheel

said ratchet member including a centrally disposed rectangular opening for receiving said double acting lead screw and means for supporting said lead screw at its ends for rotation about an axis coinciding with a diameter of said ratchet disk;

said ratchet disk including two complimentary disk portions each including an outer rim with ratchet teeth formed thereon, one said hub portions, a pair of opposed notches positioned along a first diameter of the disk defining said means for supporting said lead screw, a pair of opposed slots positioned along a second diameter of said disk normal to said first diameter for receiving said thumb wheel and means effective when the disk portions are positioned in opposed relationship for preventing rotation of one disk relative to the other;

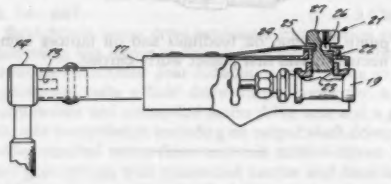
a pair of opposed jaw members each having a threaded base and carried by said lead screw for movement selectively toward and away from each other dependent upon the direction of rotation of the lead screw;

opposed faces of said jaw members including two obliquely angled planes defining a spread V shape extending from the free end of the jaw member toward said base a limited distance.

4,016,783
VALVE WRENCH

George Spector, 233 Broadway, Rm. 3615, and Sergio Casino, c/o George Spector, 233 Broadway, Rm. 3615, both of New York, N.Y. 10007

Filed Aug. 25, 1975, Ser. No. 602,666
Int. Cl.² B25B 13/48
U.S. Cl. 81—71 6 Claims



1. In a valve wrench, the combination of a housing integral with one end of a handle, said handle attached at its other end to a sidewardly extending socket wrench, said housing having an opening on an underside thereof for receiving a fitting, a forward end of said housing having an opening so said fitting protrudes outwardly therefrom, and a stabilizer bolt extending through a top wall of said housing for engaging a threaded opening along a side of said fitting.

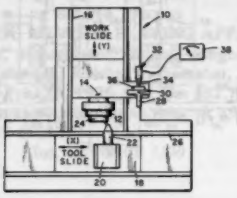
4,016,784
TOOL SETTING DEVICE

Raymond J. Brown, Clinton, Tenn., assignor to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed Jan. 5, 1976, Ser. No. 646,705
Int. Cl.² B23B 7/00
U.S. Cl. 82—2 R 3 Claims

1. A machine tool setting device for use with a numerically controlled machine utilizing a machine tool in an X-Y axes coordinate system for machining a workpiece, consisting of a

single linear variable displacement transducer having a displaceable stylus projecting therefrom, a T-shaped member having an axis of rotation in line with and perpendicular to the plane of displacement of said stylus, said T-shaped member being disposed in a contiguous relationship with said stylus for displacement thereof in response to contact of the T-shaped



member with said machine tool during relative movement therebetween in either the X or Y direction, and voltage responsive means coupled to said transducer for indicating the actual position of the machine tool along the axis the relative movement is occurring relative to a predetermined desired tool position along the same axis.

4,016,785

ROLL SLITTER

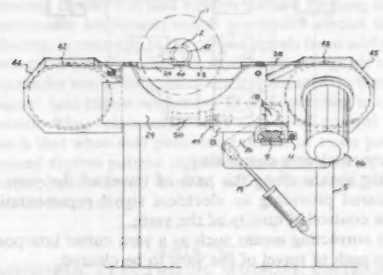
Charles Treffner, and Peter Treffner, both of 43 Yangoora Road, Belmore, Sydney, New South Wales, Australia (2192)

Filed Sept. 26, 1975, Ser. No. 617,268

Claims priority, application Australia, Sept. 30, 1974, 9083/74

Int. Cl.² B23B *37/00, 3/04*

U.S. Cl. 82—53 **10 Claims**



1. Apparatus for slitting a wound roll of sheet material into two parts comprising:

means for mounting and rotating said roll about its axis,

cutting means comprising a pair of parallel, spaced apart, rectilinear knife blades disposed in planes perpendicular to the axis of said roll, and a band saw blade disposed between said knife blades,

knife blade support means including a mounting frame, and a blade carrier band affixed to and held in tension between two spaced apart points on said mounting frame, said knife blades being fixedly mounted on said blade carrier band,

means to move said saw blade longitudinally with respect to said knife blades so as to remove swarf from between said knife blades,

means for providing relative movement between said mounting frame and said roll such that said cutting means comes into cutting engagement with said roll.

4,016,786

METHOD OF AND APPARATUS FOR STAMPING OUT SHEET MATERIAL BLANKS

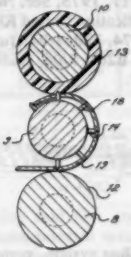
Siegfried Körner, Dresden, Germany, assignor to VEB polygraph Leipzig Kombinat fur Polygraphische Maschinen und Ausrustungen, Leipzig, Germany

Filed Dec. 16, 1974, Ser. No. 533,168

Claims priority, application Germany, Dec. 17, 1973, 3117537

Int. Cl.² B26D *3/08, 1/56*

U.S. Cl. 83—9 **7 Claims**



1. A method of stamping out sheet material blanks, comprising the first step of advancing a sheet material to a first location; the second step of cutting only partly through the sheet material with cutting tools along the outline of the desired blank; the third step of advancing the sheet material and cutting tools without displacement of said sheet material and cutting tools relative to each other jointly to a second location; the fourth step of cutting compietely through the sheet material along said outline at the second location; and the fifth step of removing the severed blank and the surrounding scrap separately from one another.

4,016,787

METHOD FOR CONTROLLING THE CUTTING FEED SPEED OF A SAW FRAME OF BAND-SAWING MACHINE OR SIMILAR MACHINE

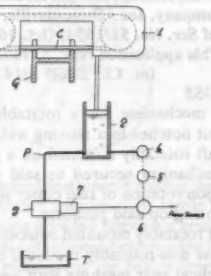
Tadahiro Sugimoto, Amagasaki, Japan, assignor to Daitoseiki Co. Ltd., Osaka, Japan

Division of Ser. No. 529,105, Dec. 3, 1974, Pat. No. 3,991,644. This application June 20, 1975, Ser. No. 588,952

Claims priority, application Japan, Dec. 4, 1973, 48-136663; Mar. 11, 1974, 49-28346

Int. Cl.² B26D *5/04;* **B23D** *53/04*

U.S. Cl. 83—13 **2 Claims**



1. A method of controlling the cutting feed speed of a saw frame of a band-sawing machine, comprising detecting a change of cutting resistance to the saw blade by detecting a change of pressure in the oil pressure cylinder supporting the saw frame, transforming the change of pressure into a voltage change, and electrically driving a flow control valve provided

in the pressure oil discharge circuit of the oil pressure cylinder which supports the saw frame in response to said detected voltage change for changing the cutting feed speed of the saw frame in response to the change of cutting resistance in order to maintain the cutting resistance to the saw blade at an optimum cutting resistance.

4,016,788

CONVEYOR SYSTEMS

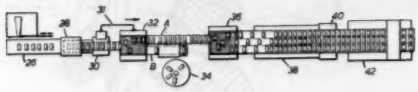
Peter D. Hardy, Welwyn Garden City, England, assignor to The Metal Box Company Limited, Reading, England

Filed July 17, 1975, Ser. No. 596,753

Claims priority, application United Kingdom, July 19, 1974, 32062/74; July 19, 1974, 32061/74; July 19, 1974, 32033/74

Int. Cl.² B26D 7/06; B65G 47/26

U.S. Cl. 83—72 **9 Claims**



1. A conveyor handling system, comprising

means defining at least two paths along which articles travel,

diverter means located in an intermediate portion of both said paths and operative to effect transfer between said paths,

first sensing means located downstream of the diverter means for sensing the rate at which the articles arrive along each said path,

comparison means responsive to the first sensing means to cause the diverter means to direct the articles between the paths in such a sense as to maintain the rates of flow of articles along said paths downstream of the diverter means substantially equal,

second sensing means located upstream of the diverter means to sense the passage of articles along said paths and past a common datum line, and

a control unit responsive to the second sensing means to determine whether there is sufficient space for each article to be transferred transversely of the direction of motion to an adjacent path without reducing a predetermined minimum spacing requirement for the article in each path, and if there is insufficient space to effect a transfer, to inhibit the diverter means from performing such a transfer.

4,016,789

DRIVE FOR ROTATABLE CUTTER MECHANISMS

Herbert W. Helm, Hollidaysburg, Pa., assignor to F. L. Smithe Machine Company, Inc., Duncansville, Pa.

Division of Ser. No. 515,534, Oct. 16, 1974, Pat. No. 3,939,723. This application Nov. 3, 1975, Ser. No. 628,145

Int. Cl.² B26D 3/14

U.S. Cl. 83—355 **7 Claims**

1. A drive mechanism for a rotatable cutter mechanism arranged to cut notches in a moving web comprising,

a cutter shaft rotatably mounted on a platform,

a cutter mechanism secured to said cutter shaft and arranged upon rotation of said cutter shaft to cut notches in a web moving on said platform,

a drive shaft rotatably mounted adjacent to said cutter shaft,

a helical gear non-rotatably mounted on said drive shaft,

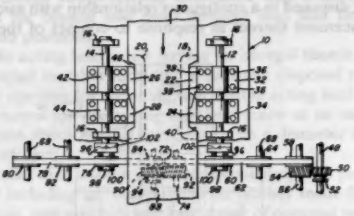
a second helical gear meshing with said first helical gear,

a pulley member non-rotatably connected to said drive shaft,

a second pulley member non-rotatably connected to said second helical gear,

endless connecting means reeved about said first and second pulleys and arranged to transmit rotation from said second helical gear to said cutter drive shaft, and

means for moving one of said first and second helical gears axially relative to each other while said helical gears remain in meshing relation with each other to radially



displace one of said helical gears relative to the other and thereby change the phase register of said cutter mechanism.

4,016,790

REGULATION OF ELECTRONICALLY OPERATED QUALITY CONTROL EQUIPMENT

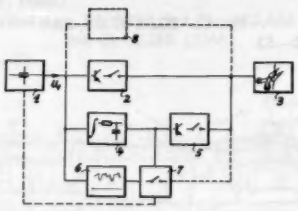
Ernst Felix, and Hans Locher, both of Uster, Switzerland, assignors to Zellweger, Ltd., Uster, Switzerland

Division of Ser. No. 486,600, July 8, 1974, Pat. No. 3,971,272, which is a continuation of Ser. No. 118,100, Feb. 23, 1971, abandoned, which is a continuation of Ser. No. 400,340, Sept. 30, 1964, abandoned. This application Apr. 23, 1976, Ser. No. 679,682

Claims priority, application Switzerland, Oct. 1, 1963, 12138/63

Int. Cl.² B26D 5/12, 5/38

U.S. Cl. 83—371 **3 Claims**



1. A yarn clearer comprising:

sensing means along the path of travel of the yarn to be cleared providing an electrical signal representative of the controlled quality of the yarn;

error correcting means such as a yarn cutter interposed in the path of travel of the yarn to be cleared;

a first electrical channel electrically coupled between said sensing means and said error correcting means to receive the electrical signal from said sensing means;

a threshold switch in said first channel, said threshold switch being the only threshold means in said first channel controlling the passage of a signal through said first channel to said error correcting means, said threshold switch set to pass only signals from said sensing means to said error correcting means which are indicative of yarn thickness of undesired magnitude;

a second electrical channel independent of said first channel electrically coupled between said sensing means and said error correcting means, to receive the electrical signal from said sensing means;

integrating means in said second channel, said integrating means only passing signals of given frequency of occurrence or duration, and

a second threshold switch in said second electrical channel, said second threshold switch receiving any signal passed by said integrating means, said second threshold switch

being the only threshold switch controlling the passage of a signal through said second channel to said error correcting means and set to pass integrated signals of given magnitude, whereby the yarn clearer may independently correct either yarn defects of given magnitude or yarn defects occuring over a given length of yarn.

4,016,791

AUTOMATIC RHYTHM PLAYING APPARATUS

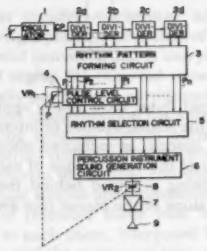
Masahiko Kolke, Hamamatsu, Japan, assignor to Nippon Gakki Seizo Kabushiki Kaisha, Hamamatsu, Japan

Filed Feb. 25, 1975, Ser. No. 552,733

Claims priority, application Japan, Mar. 2, 1974, 49-24678; May 31, 1974, 49-63008

Int. Cl.² G10F *1/00*

U.S. Cl. 84—1.03 **6 Claims**


RHYTHM PATTERN FORMING CIRCUIT
PULSE LEVEL CONTROL CIRCUIT
RHYTHM SELECTION CIRCUIT
PERCUSSION INSTRUMENT SOUND GENERATION CIRCUIT

1. An automatic rhythm producing apparatus comprising:

a rhythm pattern forming means for producing a plurality of rhythm pattern signals in the form of pulse trains;

a pulse level control circuit for variably controlling the pulse level of one or more predetermined rhythm pattern signals supplied thereto among the output rhythm pattern signals of said rhythm pattern forming means;

a rhythm selection circuit for selecting and outputting a particular rhythm pattern signal or signals from said level control circuit and said rhythm pattern forming means;

a percussion instrument sound generation circuit for producing, in response to the output signals from said rhythm selection circuit, a desired rhythm sound signal; and

a means for controlling the entire level of said rhythm sound signal, said means responsive to and operating in counter interlocking relationship with said level control circuit such that when said pulse level of one or more predetermined rhythm pattern signals is varied by said pulse level control circuit, said level of said rhythm sound signal is varied inversely.

4,016,792

MONOPHONIC ELECTRONIC MUSICAL INSTRUMENT

Ray B. Schrecongost, Park Ridge, Ill., assignor to Hammond Corporation, Chicago, Ill.

Filed Mar. 4, 1974, Ser. No. 448,020

Int. Cl.² G10H *5/06*

U.S. Cl. 84—1.01 **12 Claims**

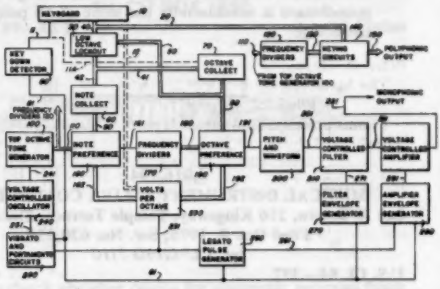
1. A single note selecting storage circuit for an electronic musical instrument having tone generators which deliver output tone signals of an octave, said single note selecting storage circuit comprising:

a plurality of switch means operably designatable of a desired octaval note name and number in a predetermined series of octaves;

note name selector means coupled to said switch means for receiving an octave of predetermined tone signals from said generator and delivering a first tone signal therefrom representative of a particular note name of said octave in response to an operated one of said switch means, said particular note name being the same as the note name designated by said operated one of said switch means;

at least one one-half frequency divider means connected to said note name selector means for frequency-dividing the first tone signal delivered therefrom into a second tone signal which is an octave lower than said first tone signal; and

octave selector means operatively coupled to said switch



means for receiving said first and second tone signals from said note name selector means and said frequency divider means respectively and delivering an output signal of one of said first and second tone signals having an octaval number, corresponding to the octaval number operably designated in said switch means upon operation of said operated one of said switch means.

4,016,793

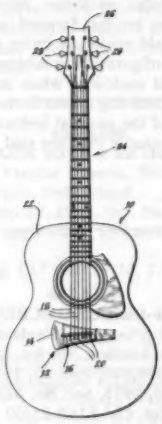
BRIDGE FOR STRINGED MUSICAL INSTRUMENT

Michael Kasha, Tallahassee, Fla., assignor to Norlin Music, Inc., Lincolnwood, Ill.

Filed May 12, 1975, Ser. No. 576,282

Int. Cl.² G10D *3/04*

U.S. Cl. 84—307 **7 Claims**



1. In a stringed musical instrument having lower frequency or bass strings and higher frequency or treble strings, vibrations of the strings being coupled through a bridge to a soundboard, the mechanical compliance between the bridge and the soundboard at each point along the bridge from the bass end thereof to the treble end thereof being dependent on the frequency being coupled by the bridge to the soundboard at that point, a bridge having:

a first predetermined width at the bass end thereof, said width being sufficient to effectively couple the lowest frequency vibrations to be coupled by said bridge;

a second predetermined width at the treble end thereof, said

second width being less than said first width and being sufficient to effectively couple the highest frequency vibrations to be coupled by said bridge; and

a width at each point intermediate said bass and treble ends which is both sufficient to effectively couple the frequency coupled at that point and is selected such that the mechanical compliance between the bridge and the soundboard is substantially the same at all points along the bridge.

4,016,794

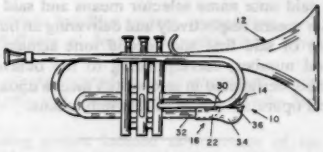
MUSICAL INSTRUMENT SALIVA COLLECTOR

Lee A. Brown, 216 Kingsway, Temple Terrace, Fla. 33617

Filed Oct. 8, 1975, Ser. No. 620,510

Int. Cl.² G10D 7/10

U.S. Cl. 84—397 **6 Claims**



1. A cup-like device designed for use with a musical instrument including at least one tube having an aperture formed therein and a water-key formed on the tube movable between a first and second position to selectively open and close the aperture to collect saliva and other liquids emitted from the water-key when in the first position, said device comprising a substantially rectangular enclosure having a substantially bulbous configuration on the forward portion thereof, the forward portion of said enclosure being arcuate in shape to form said bulbous configuration to substantially surround the water-key within said enclosure when in either the first or second position and fastening means formed on said enclosure to engage the tube of the musical instrument such that said fastening means detachably attaches said device to the musical instrument.

4,016,795

SELF-DRILLING SCREWS

Peter John Gill, Wolverhampton, England, assignor to GKN Screws & Fasteners Limited, Warley, England

Division of Ser. No. 549,688, Feb. 13, 1975. This application Oct. 20, 1975, Ser. No. 623,612

Int. Cl.² F16B 25/00

U.S. Cl. 85—41 **1 Claim**

1. A self-drilling fastener comprising a head, a shank including an externally screw-threaded part adjacent the head and a drill point at the end of the shank remote from the head for drilling through relatively thick metal, said drill point occupying a relatively long portion of the shank and including a pair of diametrically opposed straight flutes being substantially limited to said drill point, said flutes being inclined in opposite directions at equal acute angles to the axis of the shank, each flute being defined by a leading face and trailing face inclined relative to each other at an angle of approximately 120°, and meeting each other along a straight line inclined to said axis, said straight line and said axis being askew with respect to each other, and a pair of planar faces at the free end of the drill point, said planar faces being oppositely disposed with respect to the axis of the shank and equally angularly inclined thereto, said planar faces intersecting each other on a line of intersection passing through the axis and disposed at or closely adjacent an imaginary cross-over point where said straight

lines of said straight flutes most nearly approach each other across the axis of the shank, the line of intersection also being slightly angularly spaced, as measured about the axis of the shank, in advance of the cutting edge of each flute, and a lip clearance angle being provided behind the cutting edge of each flute by the slope of the planar face away from said line of intersection.

4,016,796

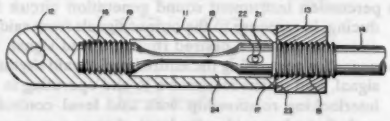
WEAPON RETENTION DEVICE

Jack D. Brannan, Bloomington, Minn., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Mar. 29, 1976, Ser. No. 671,235

Int. Cl.² F41F 3/04

U.S. Cl. 89—1.806 **10 Claims**



1. A retention device for releaseably retaining a missile to a launching apparatus, said retention device comprising:

a cylindrical member having first and second ends, a central bore, and a slot which communicates with said second end;

an elongated tensile link having first and second ends, a region of reduced tensile strength, means for attachment of said first end of said link within said central bore, and a transverse hole located between said region of reduced tensile strength and said second end;

a link preloading element having means for attachment to said elongated tensile link, and a bearing surface for engagement against said second end of said cylindrical member;

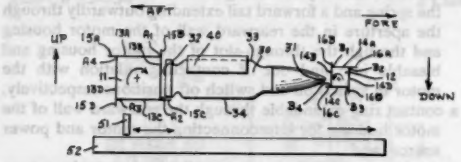
said first end of said elongated tensile link being retained within said cylindrical member central bore, and said link preloading element being attached to said elongated tensile link at a point between said hole and said second end of said link; and

an anti-torque pin penetrating said elongated tensile link through said hole, and said pin also penetrating said cylindrical member through said slot in said second end of said cylindrical member for preventing relative rotation between said tensile link and said cylindrical member.

4,016,797
DUMP BAR TRANSFER MECHANISM

William E. Lock, 183 Wygant Road, Horseheads, N.Y. 14845

Filed June 18, 1976, Ser. No. 697,661
Int. Cl.² F41D 9/00
U.S. Cl. 89—34 8 Claims



1. A dump bar transfer mechanism, adapted for use in accurately removing a plurality of rounds of ammunition from a moving horizontal conveyor that is carrying said rounds of ammunition, and urging the removed rounds of ammunition into a horizontally-positioned, partitioned stationary tray, wherein each round of ammunition has a fore end, an aft end, an upwardly facing external surface portion, and a downwardly facing external surface portion having a fore end and an aft end, and wherein the moving conveyor and the stationary tray are in equal spaced-apart relationship, comprising:

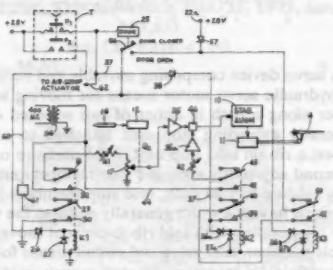
a. a plurality of rotatable dump bars, in parallel spaced relationship to each other, interposed between the moving conveyor and the stationary tray, wherein each said dump bar of said plurality has a plurality of intersecting planar surfaces, with each surface having an extension;

b. and, means for selectively rotating each said rotatable dump bar, with said rotating means operatively associated with each said rotatable dump bar.

4,016,798
GUN TO RUDDER INTERCONNECT SYSTEM

Sus Inouye, Los Angeles, Calif., assignor to Northrop Corporation, Los Angeles, Calif.

Filed Aug. 25, 1975, Ser. No. 607,384
Int. Cl.² B64D 7/04
U.S. Cl. 89—37.5 R 10 Claims



1. In an aircraft with an off-center gun having an off-center recoil producing a directional type moment on said aircraft when fired and a movable pilot-controlled control surface producing aircraft flight deflection about substantially the same axis as said directional moment; means for compensating for said moment comprising:

a. an interconnect system operatively connected between a trigger of said gun and said control surface;

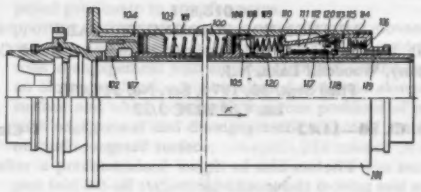
b. said interconnect system having means for deflecting said surface separate from the pilot-controlled surface movement and in a direction to counteract said moment; and

c. means for operatively energizing said interconnect system responsive to the pulling of said trigger.

4,016,799
SHOCK ABSORBER FOR FIREARMS AND THE LIKE

Gildas Le Pierres, La Ferte Alais, France, assignor to International Vibration Engineering, Boutigny-sur-Essonne, France

Filed Feb. 26, 1975, Ser. No. 553,157
Claims priority, application France, Feb. 27, 1974, 74.06614; Sept. 17, 1974, 74.31379
Int. Cl.² F41F 19/00
U.S. Cl. 89—42 B 19 Claims



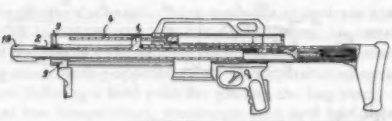
1. In a shock absorber device for automatic weapons firing in bursts wherein all the shots in a burst with the exception of the first shot are fired during the return movement into the initial position of the weapon, which device comprises a support member, a recoiling member which is axially movable relative to said support member from a rest position to an extreme recoil position, elastic restoring means between said support member and said recoiling member for bringing said latter into said rest position, and braking means placed between said support member and said recoiling member for braking the latter during the recoil movements caused by the first shot of a burst, said braking means having at most a reduced effectiveness during the recoil movements caused by all the other shots of said burst,

the improvement wherein said braking means comprise force transmitting means carried on said recoiling member for sliding movement between a front abutment on said recoiling member and a rear abutment on said recoiling member, and means for causing said force transmitting means to move, when between said abutments, at a lower speed than that at which it moves when in contact with one of said abutments during movement of said recoiling member.

4,016,800
PORTABLE FIREARM WITH A RETRACTABLE BARREL

Maurice Rusbach, Vernier Geneva, Switzerland, assignor to Sarmac S.A., Geneva, Switzerland

Filed Nov. 29, 1974, Ser. No. 528,392
Claims priority, application Switzerland, Dec. 28, 1973, 18209/73
Int. Cl.² F41C 7/10, 21/18
U.S. Cl. 89—177 9 Claims



1. A firearm having a stock, a barrel carried by the stock for movement lengthwise of the barrel relative to the stock between an extended firing position and a retracted carrying position, a recoil brake carried by the stock for braking the recoil stroke of the barrel relative to the stock when a shot is fired, a manually operable mechanical connection device between the barrel and the recoil brake for selectively connecting the barrel to the recoil brake in said extended position of the barrel, a manually operated mechanical connection device between the barrel and the stock for selectively con-

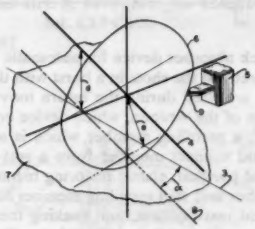
necting the barrel to the stock to retain the barrel in said retracted position of the barrel relative to the stock, the first-mentioned connection device comprising a movable stop carried by and movable relative to said barrel, said recoil brake having a rod that extends parallel to said barrel, and means for selectively moving said stop into and out of the path of said rod with said rod and barrel remaining parallel to each other as said rod and barrel move relative to each other upon movement of said barrel toward said retracted position.

4,016,801

METHOD FOR FORMING THREADS

J. D. Ditson, Asbury, N.J., assignor to Ingersoll-Rand Company, Woodcliff Lake, N.J.

Filed Sept. 30, 1974, Ser. No. 510,478
Int. Cl.² B23C 3/32
U.S. Cl. 90—11.42 **6 Claims**



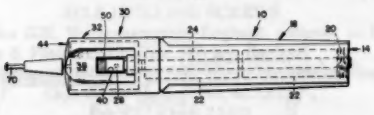
1. The method of generating a continuous non-symmetrical thread of a given pitch on a cylindrical workpiece by a modified process of thread whirling comprising:
rotating the workpiece about a first axis corresponding to the axis of the workpiece;
making a continuous cut around a surface of said cylindrical workpiece by means of a point cutting tool rotating about a second axis offset from and non-parallel to said first axis, said tool is in essentially continuous contact with said workpiece; and
effecting relative linear motion between said workpiece and said rotating tool parallel to said first axis and in spaced relationship with the rotation of said workpiece corresponding to the pitch of the threaded form.

4,016,802

SCRIBING TOOL

Gerard P. O'Connell, Holyoke, Mass., assignor to Baltimore Brushes, Inc., Boston, Mass., a part interest

Filed Oct. 6, 1975, Ser. No. 619,623
Int. Cl.² B23C 1/20
U.S. Cl. 90—12 R **1 Claim**



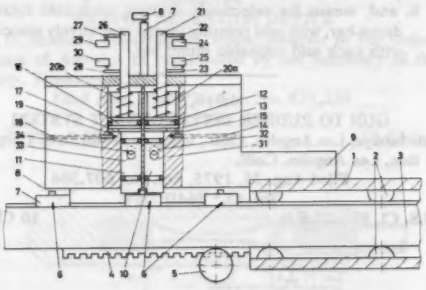
1. A writing instrument comprising:
an elongated tubular casing having a hollow interior closed at its rearward end by a rearward end wall and opened at its forward end,
a tubular motor housing having a hollow interior closed at its forward end by an apertured forward end wall and closed inboard of its rearward end by an apertured rearward wall;
the forward end of the casing being nestably receivable within the rearward end of the motor housing,
a flat on the motor housing exterior having a through-slot leading to the motor housing interior,
a motor nested within the motor housing interior,
a power source nested within the casing interior,
a spring seated within the casing interior adjacent the rearward end thereof in biasing relationship with the power source,
a switch bus extendable in the casing and motor housing interiors through the aperture in the rearward and having an offset laterally-extending rearward tail seating against the spring and a forward tail extending outwardly through the aperture in the rearward wall of the motor housing and through the through-slot of the motor housing and biasable into and out of contacting relation with the motor in switch on and switch off positions respectively,
a contact ring extendable through the rearward wall of the motor housing for interconnecting the motor and power source, and
an etching tool projecting outwardly through said aperture of said forward end wall from and having a driven relationship with the motor for rotation when the switch bus is in switch-on position and non-rotation when the switch-bus is in switch-off position.

4,016,803

SERVO DEVICE

Svend Ove Soby, Sonderborg, Denmark, assignor to Danfoss A/S, Nordborg, Denmark

Filed Nov. 10, 1975, Ser. No. 630,293
Claims priority, application Germany, Nov. 12, 1974, 2453561
Int. Cl.³ F15B 15/26
U.S. Cl. 91—43 **7 Claims**



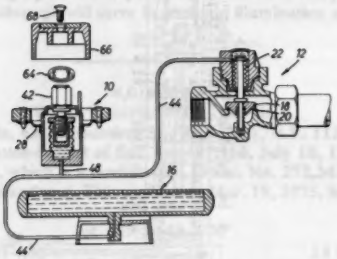
1. A servo device comprising movable and stationary members, hydraulic servo motor means for moving said movable member along a path in either of two selected directions, a transversely extending stop unit attached to said movable member, a rib on said stop unit, fluid pressure operated first and second adjacently arranged stop members movable transversely relative to said path, said stop members jointly defining a recess having a width generally equal to the width of said rib for cooperating with said rib to prevent movement of said movable member, first valve and circuit means for supplying a working fluid to said servo motor means, said first circuit means having throttle valve means formed between said stationary member and at least one of said stop members for throttling the fluid flow from said first valve to said servo motor means, first switch means operated by said stop members to open said first valve when said stop members are in initial up positions and to close said first valve when both of said stop members are in final down positions resting on said stop unit, second valve and circuit means for moving each of said stop members to initial positions which clear said rib and actuate said first switch means, second switch means actuated by said stop unit for closing said second valve to cause said stop members to descend until one rests in an intermediate position on said rib wherein throttling occurs in said first circuit and the other rests in a final position on said stop unit.

4,016,804

THERMOSTATIC CONTROL UNIT FOR RADIATOR VALVES

Kvetoslav Turecek, Brampton, Canada, assignor to Danfoss A/S, Nordborg, Denmark

Filed Dec. 22, 1975, Ser. No. 642,790
Int. Cl.² F01B *19/00*
U.S. Cl. 92—34 **3 Claims**



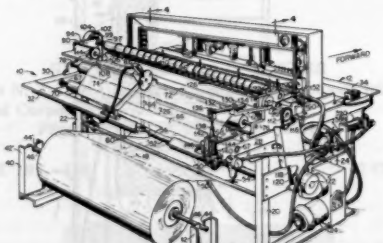
1. A thermostatic control unit for radiator valves comprising, a cylindrically shaped casing having an upper collar portion defining a hole, a bellows in said casing having the lower end thereof fixedly attached to said casing, port means in said casing providing fluid communication between the interior of said bellows and the exterior of said casing, a movable nut attached to the upper end of said bellows, a calibration screw extending through said hole and threadedly engaging said nut for moving it to vary the internal volume defined by said bellows, abutment lug means extending from said collar, stop lug means carried by said screw so as to be rotatable therewith, washer means surrounding said screw having outer lug means engageable with said abutment lug means and inner lug means engageable with said stop lug means.

4,016,805

METHOD FOR THE MANUFACTURE OF DUNNAGE BAG LINERS

Clinton R. Hollis, Camden, Ark., assignor to International Paper Company, New York, N.Y.

Continuation-in-part of Ser. No. 447,763, March 4, 1974, Pat. No. 3,921,506. This application Mar. 31, 1975, Ser. No. 563,831
Int. Cl.² B31B *41/00*
U.S. Cl. 93—35 VL **5 Claims**



1. In a method for the manufacture of inflatable liners of discrete length for dunnage bags or the like from a continuous length of air-impervious tubular material flattened into sheet form comprising top and bottom layers, the steps of

storing said sheet material in position for dispensing in a forward direction,

disposing the leading end of said material in the nip between a pair of feed rolls, at least one of which is movable between positions of pressure engagement and disengagement with said material in said nip,

connecting said feed rolls in driving relationship to one another and continuously rotating said rolls at all times during the manufacture of said liners,

moving said movable roll into pressure engagement with said material in said nip,

rotating at least one of said feed rolls to move said material forwardly to a cut-off station where said material is disposed proximate to a knife means,

supporting said material transverse to its forward movement at a location between its storage location and said feed rolls in engagement with an elognated surface and below an elongated friction means aligned with said elongated surface and which is movable between positions of pressure engagement and disengagement with said material on said elongated surface,

after a predetermined length of said material has moved past said cut-off station, simultaneously moving said movable feed roll toward its position of disengagement with said material, moving said movable friction means toward its position of engagement with said material to stop the forward movement thereof,

clamping said material between opposed surfaces along elongated spaced apart locations on opposite sides of said knife means, each of said locations extending transversely of he forward direction of movement of said material,

thereafter severing said material fully across its dimension transverse to its direction of forward movement, and

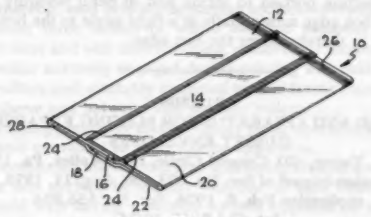
sealing to one another the layers of the trailing end of the severed length of material along a line extending fully across the material transversely of its direction of forward movement.

4,016,806

METHOD AND APPARATUS FOR MAKING TRANSVERSE CLOSURE SEALS IN COMPOSITE THERMOPLASTIC BAG STOCK

Samuel J. Schuster, 617 Vallombrosa, Pasadena, Calif. 91107

Filed Apr. 5, 1976, Ser. No. 673,916
Int. Cl.² B31B *1/84*
U.S. Cl. 93—35 R **17 Claims**



1. Apparatus for making high integrity, transverse closure heat seals in continuous, tubular thermoplastic bag stock of diverse transverse cross-section thickness and/or composition, the bag stock having opposed faces, the apparatus comprising:

means defining a feed path for guiding the bag stock;

a first low temperature, transverse heat seal bar disposed along the feed path for applying heat to one of the faces of the stock to at least partially seal the bag stock, said first heat seal bar adapted to coact with an opposed resilient back-up surface;

a second low temperature, transverse heat seal bar spaced apart from the first heat seal bar and disposed along the feed path for applying heat to the other face of the bag stock along a transversely-extending area at least partially coinciding with the seal applied by the first heat seal bar first to complete the transverse closure seal, the second heat seal bar adapted to coact with an opposed, resilient back-up surface;

means for intermittently advancing the bag stock in a direction from the first heat seal bar towards the second heat seal bar along the feed path between dwell periods;

means operatively associated with the bag stock advancing means for reciprocating the first heat seal bar toward and away from the feed path in timed relation with the intermittent advancement of the bag stock to effect the first seal during dwell periods; and

means operatively associated with the bag stock advancing means for reciprocating the second heat seal bar toward and away from the feed path in timed relation with the intermittent advancement of the bag stock to effect the second seal during dwell periods.

4,016,807

BOX AND METHOD OF COVERING A BOX EDGE

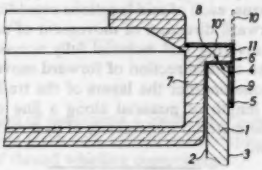
Walter Schellenberg, Diepoldsau, Switzerland, assignor to Max Sandherr AG, Switzerland

Filed Apr. 6, 1976, Ser. No. 674,105

Claims priority, application Switzerland, Apr. 23, 1975, 5163/75

Int. Cl.² B31B *1/00*

U.S. Cl. 93—39 C **7 Claims**



1. A method of covering the exposed edge of a box having an open end comprising the steps of

placing a heat-shrinkable adhesive plastic foil strip around the peripheral area of the open end of the box adjacent to the box edge with a portion of the width of the foil strip projecting beyond the box edge; and

heating the projecting portion of the strip to cause the projecting portion to shrink and to bend inwardly over the box edge substantially at a right angle to the box wall and to thereby cover the box edge.

4,016,808

METHOD AND APPARATUS FOR MAKING EXPANSIBLE GUSSET ENVELOPES

Louis H. Young, 401 Caranel Circle, Penn Valley, Pa. 15675

Continuation-in-part of Ser. No. 603,400, Aug. 11, 1975. This application Feb. 9, 1976, Ser. No. 656,094

Int. Cl.² B31B *29/26*

U.S. Cl. 93—62 **17 Claims**

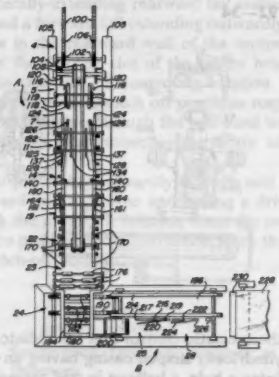
17. A method for fabricating an expansible gusset envelope from a blank having first and second panels hinged together along triple transverse fold lines which define inwardly collapsible bottom gusset sections therebetween, and flaps hinged to the side of one of said panels along triple longitudinal fold lines which define inwardly collapsible side gusset sections therebetween, and tabs hinged to one of said gusset sections along a line hinging the other of said gusset sections to the first panel with adjacent tabs hinged to each other along a medial fold line detached from said other gussets, comprising the steps of:

a. folding the pair of gusset sections to which the tabs are hinged inwardly about the medial fold line thereof,

b. bending back the tabs into overlying disposition with the adjacent portion of the gusset sections to which they are hinged,

c. crimping the tabs along the line hinging them together to form a saddle having its fold line oriented transverse to the medial fold line in the underlying gusset section, including a triangular corner gusset in the underlying gusset section,

d. folding the other of the gusset sections inwardly about the medial fold line thereof and tucking the other of said



gusset sections into glued disposition with the saddles, and

e. glueing the flaps and the other panel into adhesive disposition with each other so as to overlie the first panel with all gusset sections inwardly collapsed with closed corner gussets.

4,016,809

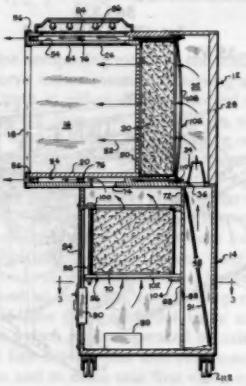
CLEAN AIR WORKBENCH

Philip R. Austin, Livonia, Mich., assignor to Contamination Control Laboratories, Inc., Livonia, Mich.

Filed July 16, 1975, Ser. No. 596,267

Int. Cl.² F23J *11/00*

U.S. Cl. 98—115 LH **9 Claims**



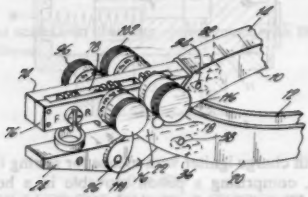
1. A workbench comprising a work platform having a work area defined by a plurality of walls that are open at the front of the work area at a leading edge to provide access to the work area, the rear wall of said plurality of walls being permeable for passage of air, air nozzle means extending around said work area at said leading edge for directing a curtain of air

forward of said work area, and air supply means for supplying air to said permeable wall and to said air nozzle means so that air can be directed forward through said work area as laminar flow and air can be directed from said air nozzle means as a curtain surrounding the laminar flow of air from said work area, interior portions of said walls being transparent and contain illumination apparatus for illuminating said work area, and said air supply means includes perimeter air ducts that extend through said walls to said air nozzle means, said portions forming a part of said perimeter air ducts so that passage of air therethrough will serve to cool said illumination apparatus.

4,016,810
JEWELRY IMPRINTING DEVICE

Leslie Szikla, 63-34 Saunders St., Rego Park, N.Y. 11374

Continuation-in-part of Ser. No. 487,166, July 10, 1974, abandoned, which is a continuation of Ser. No. 272,342, July 17, 1972, abandoned. This application Mar. 19, 1975, Ser. No. 559,662
Int. Cl.² B44B 5/00
U.S. Cl. 101—4 13 Claims

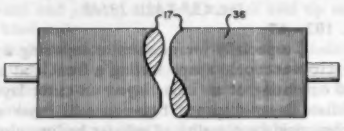


1. A tool for stamping symbols on jewelry comprising: a pliers having a pair of handle members, said members moveable between a first open position and a second clamping position, a jaw element mounted on each of said handle members, a plurality of marking wheels in one of said jaw elements, an axle mounted on said one jaw element, said marking wheels being mounted on said axle, said axle comprising means for permitting the marking wheels to move vertically with respect to the axis of said axle and each other whereby the curvature of the jewelry is compensated for, a plurality of cog wheels in said one jaw element equal in number to the number of marking wheels, each of said cog wheels being in cooperating relationship with a different one of said marking wheels, and means for rotating said cog wheels individually to move selected ones of said marking wheels.

4,016,811
GROOVED ROLLER DAMPENER

Eugene N. Zavodny, Riverside, assignor to Rockwell International Corporation, Pittsburgh, Pa.

Filed Aug. 20, 1975, Ser. No. 606,113
Int. Cl.² B41F 7/24
U.S. Cl. 101—148 2 Claims

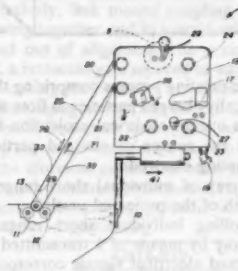


1. A mechanism for dampening a plate on the plate cylinder of a lithographic printing press comprising a reservoir of dampening fluid spaced from said plate cylinder, roller means for transferring a continuous supply of dampening fluid in the form of a thin film from said reservoir to the plate on said plate cylinder including at least one roller having a smooth, continuous, resilient surface, a transfer roller journalled parallel to said one roller with the surface of said transfer roller being in contact and forming a coacting nip with said one roller, the surface of said transfer roller being metallic and hydrophilic and having closely spaced, continuous, spiral grooves formed therein, means for driving said one roller at a surface speed equal to the surface speed of said plate cylinder, and separate means for rotating said transfer roller at variable surface speeds different from the surface speed of said one roller to thereby meter the volume of dampening fluid transferred from said transfer roller to the surface of said one roller as the latter leaves the said nip.

4,016,812
DEVICE FOR CLEANING INK FROM A PRINTING APPARATUS

David V. Lauk, 2233 Sussex Lane, Apt. 1010, Indianapolis, Ind. 46219, and Lloyd W. Bills, 8268 E. 40th Place, Indianapolis, Ind. 46226

Filed June 13, 1975, Ser. No. 586,568
Int. Cl.² B41F 35/04
U.S. Cl. 101—425 5 Claims



1. A device for cleaning ink from rollers on a printing apparatus comprising:

a container for holding ink solvent;

a printing apparatus having said container mounted thereon, said printing apparatus includes a frame with at least three rollers of which two are adjacent transfer rollers and with the remaining, removeably mounted third roller normally engaged during printing with said transfer rollers and rotatably mounted to said frame immediately above and between said transfer rollers;

mounting means on said container being operable to mount said container to said printing apparatus;

a continuous ink transfer web extending around and having a first surface in contact with one of said three rollers, said web having a second surface opposite of said first surface with said second surface in contact with two of said three rollers, said web transferring ink from said three rollers to said first surface and said second surface of said web as said three rollers are rotated:

roller means mounted on said container and in contact with said web being operable to direct said web into said ink solvent; and,

wiping means mounted on said container and in contact with said first surface and said second surface of said web being operable to wipe ink solvent off said first surface and said second surface of said web;

said wiping means includes a pair of brushes mounted to said container and within said ink solvent, said brushes are spaced apart with said web passing therebetween, said brushes are in contact with said first surface and said second surface of said web brushing ink from said web;

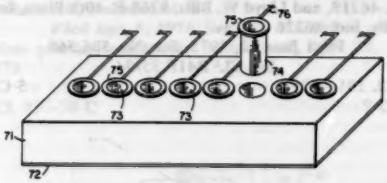
said wiping means further includes a pair of elongated scraping members mounted to said container and located exteriorly of said ink solvent, said members are spaced

apart with said web passing therebetween, said members are in contact with said first surface and said second surface of said web scraping liquid off of said web.

4,016,813
ELECTROSTATIC LINE PRINTER

Gerald L. Pressman, San Jose, Calif., and John V. Casanova, Racine, Wis., assignors to Electroprint, Inc., Cupertino, Calif.

Continuation of Ser. No. 442,278, Feb. 13, 1974, abandoned, which is a continuation of Ser. No. 281,907, Aug. 18, 1972, abandoned, which is a continuation of Ser. No. 864,022, Oct. 6, 1969, Pat. No. 3,689,935. This application Jan. 21, 1975, Ser. No. 542,756
Int. Cl.² G01D 15/10
U.S. Cl. 101—426 22 Claims



1. An electrostatic printing process comprising the steps of:
projecting electrically charged particles to flow along a path by means of an overall electrical projection field established between the source of charged particles and a particle accelerating electrode;
establishing an array of individual short range electrical fields in the path of the projected particles;
selectively controlling individual short range electrical fields in the array by means of a transmitted pattern of individual selected electrical signals corresponding to a pattern to be reproduced, the short range fields being controllable to cause blocking or permit passing of the projected particles through the array; and
employing the projected particles emerging from the array to print a pattern on a print receiving medium which corresponds to the pattern of selected electrical signals.

4,016,814
PLANOGRAPHIC PRINTING MASTER

Richard L. Schank, Webster, N.Y., and Richard G. Crystal, Los Altos, Calif., assignors to Xerox Corporation, Stamford, Conn.

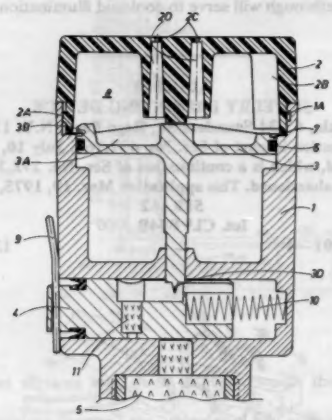
Filed Apr. 13, 1973, Ser. No. 351,130
Int. Cl.² B41N 1/14; B41C 1/10
U.S. Cl. 101—467 14 Claims

1. A method of producing a printing master comprising:
a. providing a suitable substrate,
b. coating said substrate with a layer of an uncured silicone gum composition, said composition containing an activating proportion of a blowing agent,
c. depositing a particulate image pattern on said layer,
d. curing said layer to an ink releasable condition, whereby said blowing agent is activated causing blowing in said image areas, and
e. removing particles from said image pattern to reveal ink receptive foamed image areas corresponding to said deposited image pattern.

4,016,815
DEPTH CHARGE IGNITER

Jan Bjork, Bjarred, and Kjell Ake Bertil Holmgren, Trelleborg, both of Sweden, assignors to Aktiebolaget Thulinverken, Landskrona, Sweden

Filed Oct. 29, 1975, Ser. No. 626,767
Claims priority, application Sweden, Nov. 1, 1974, 7413765
Int. Cl.² F42B 21/00; F42C 15/10
U.S. Cl. 102—7 7 Claims



1. A depth charge igniter with means for setting the detonation depth, comprising a piston movable in a housing and provided with a firing pin for hitting a percussion cap, the piston being acted on by the surrounding water pressure in its direction of motion towards the percussion cap, characterised by a shear ring holding the piston to the housing and arranged to be sheared off at a certain water pressure thus setting the piston free to move in the said direction under the influence of a spring means, and means whereby the circumferential length of the shear ring in engagement between the piston and the housing is adjustable for obtaining the desired detonation depth comprising respectively rotatable structure engaging said piston with said ring, and means on said piston overlapping a variable portion of the circumference of said ring in response to the extent of relative rotation.

4,016,816
SHELL ESPECIALLY FOR MORTARS

Bengt Håkan Larsson, Eskilstuna, and Hans Erik Valdemar Karlsson, Sollentuna, both of Sweden, assignors to Forenade Fabriksverken, Eskilstuna, Sweden

Filed July 21, 1975, Ser. No. 597,687
Int. Cl.² F42B 13/48
U.S. Cl. 102—67 3 Claims

1. A shell, especially for mortars, comprising a casing of circular cross-sectional shape having a front end and a rear end and consisting of an inner layer, an outer layer and an intermediate layer disposed between said inner and outer layers comprising a plurality of splinter bodies, circumferentially extending guide elements on the outer surface of said outer layer intermediate the ends of said casing, said inner layer and said intermediate layer extending axially behind said guide elements toward said casing rear end and at least one annular flange projecting radially outward from said inner layer through said intermediate layer and disposed at an axial

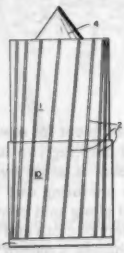
location intermediate said guide elements and said casing rear end, said annular flange having an outwardly projecting, peripheral end surface in abutting engagement with the inside of said outer layer.

4,016,817

BULLET FOR HUNTING SHOTGUNS

Moisés Arciniega Blanco, Telemaco, 18, Madrid-27, Spain

Filed Oct. 10, 1975, Ser. No. 621,618
Int. Cl.² F42B *11/02*
U.S. Cl. 102—92.4 11 Claims



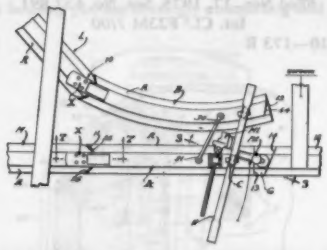
1. A bullet for hunting shotguns, said bullet comprising:
a conical tip member having a pointed forward end and an interiorly threaded base end;
a cylindrical intermediate element separate from said tip member and having in the outer surface thereof a plurality of inclined grooves, said intermediate element having a forward end joining said base end of said tip member and a base end;
a rear cylindrical element separate from said intermediate element and having in the outer surface thereof a plurality of inclined grooves, said rear element having a forward end joining said base end of said intermediate element and an inwardly and concavely recessed base end; and
threaded pin means, having a head positioned in said recessed base end of said rear element, extending longitudinally through said rear element and said intermediate element and threaded into said threaded base end of said tip member, for connecting said tip member, said intermediate element and said rear element into a unitary projectile.

4,016,818

MONORAIL SWITCH

Floyd P. Ellzey, 2301 Marshallfield Lane, Redondo Beach, Calif. 90278

Filed Sept. 2, 1975, Ser. No. 609,229
Int. Cl.² E01B *25/26*
U.S. Cl. 104—103 4 Claims



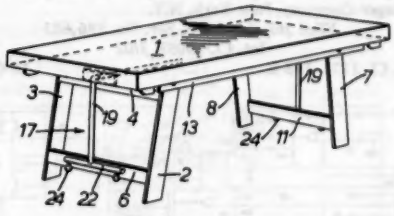
1. An articulated self-aligning switch for elevated monorail track, and including; a pair of swinging switch beams with bearing means pivotally mounting the switch beams to the terminal ends of a main line track beam and a lateral track beam respectively, link means coupling the pair of switch beams to swing together and in spaced relation to each other and into and out of alignment with a continuing main line track beam, a retractile gate secured to ways and shiftable into and out of working position between the end faces of either of said pair of swinging switch beams and the end face of the continuing main line track beam, said retractile gate having substantially the same beam cross section with rails for truck support as the aforesaid switch and other track beams thereby to establish track continuity, and means replaceably retracting the gate from said working position to release the switch beams for selective positioning.

4,016,819

TABLE TROLLEY

Donald William Cowling, 14 Dover St., North Clayton, Victoria, Australia (3168)

Filed Aug. 6, 1975, Ser. No. 602,527
Claims priority, application Australia, Aug. 7, 1974, 8447/74; Oct. 16, 1974, 74420/74
Int. Cl.² A47B *3/02*
U.S. Cl. 108—19 12 Claims



1. A table comprising:
a table top having opposite sides and opposite ends;
a first set of legs having a pair of leg members generally located at opposite ends of the table for supporting said table top in a generally horizontal position, each pair of leg members being located along a line extending between said sides of the table top; and
a second set of legs having a pair of leg members generally located at opposite ends of said table, said table top being pivotally attached to said second set of legs along an axis extending between said ends of the table top generally perpendicular to said lines for movement from said generally horizontal position to a position in which said table top is generally vertical when said table top is supported by said second set of legs,

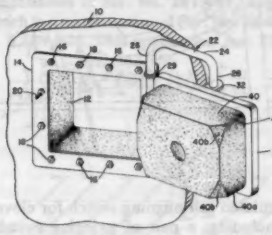
said first set of legs being displaceably coupled to said table top for facilitating pivotal movement of said table top.

4,016,820

CLOSURE ASSEMBLY FOR A FURNACE

Richard C. Johnson, and Kenneth E. Lee, both of Dansville, N.Y., assignors to Foster Wheeler Energy Corporation, Livingston, N.J.

Filed Nov. 17, 1975, Ser. No. 632,891
Int. Cl.² F23M 7/00
U.S. Cl. 110—173 R 8 Claims



1. A closure assembly for an access opening in a furnace wall, said assembly comprising:

a shell member;

a plug member having a portion extending in said shell member and a portion adapted to extend in said access opening;

a stepped bore extending through said plug member and defining a shoulder between its ends;

a rod affixed at one end to the inner wall of said shell member and extending within said bore;

a nut threadedly engaging said rod within said bore and bearing against said shoulder to secure said plug member to said shell member;

an insert positioned in that portion of said bore not occupied by said rod, said insert being of the same material as said plug member; and

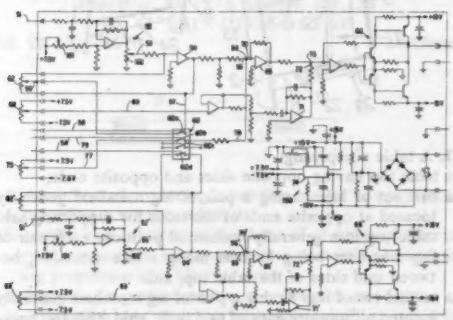
mounting means for pivotably mounting said shell member to said furnace wall for movement between a closed and open positions relative to said access opening.

4,016,821

ELECTRONIC CONTROL OF BIGHT, FEED AND FEED BALANCE IN A SEWING MACHINE

Philip Francis Minalga, Piscataway, N.J., assignor to The Singer Company, New York, N.Y.

Filed July 16, 1975, Ser. No. 596,683
Int. Cl.² D05B 3/02
U.S. Cl. 112—158 E 16 Claims



1. In a sewing machine having stitch-forming instrumentalities positionally controlled over a predetermined range between stitches to produce a pattern of feed and of bight controlled stitches; logic means for storing pattern stitch information in digital form; means operating in timed relation with the sewing machine for recovering selected digital pattern stitch information from said logic means; feed digital-to-analog converter means and bight digital-to-analog coverter means for generating positional feed and bight analog signals, respectively, related to said selected digital pattern stitch information; and feed closed loop servo means including reversible electric motor and bight closed loop servo means including reversible electric motor responsive to said feed and bight analog signals, respectively, for positioning said stitch-forming instrumentalities to produce a pattern of stitches corresponding to the selected digital pattern stitch information; wherein the improvement comprises:

signal control operational amplifier means interposed between said feed digital-to-analog converter means and said feed closed loop servo means, and between said bight digital-to-analog coverter means and said bight closed loop servo means, each of said operational amplifier means having a feedback circuit including a rheostat;

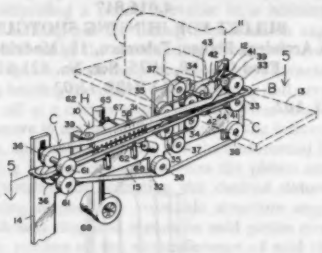
switch means effective on operator command to insert a wiper on said rheostat in bypass arrangement in said feedback circuits, whereby the gain of said operational amplifier means may be varied the analog signal received from said feed and said bight digital-to-analog converter means and transferred, respectively, to said feed and said bight closed loop servo means.

4,016,822

SEAM FOLDING AND PRESSING ATTACHMENT FOR SEWING MACHINES

Antonio Pugliese, Miami, Fla., assignor to Shap, Inc., Opa Locka, Fla.

Filed Nov. 20, 1975, Ser. No. 633,854
Int. Cl.² D05B 27/00
U.S. Cl. 112—217 10 Claims



1. A seam folding attachment for sewing machines comprising conveyor means for carrying two super-imposed layers of cloth upon which a seam is sewn by the sewing machine, power operated means operating said conveyor means, supporting means mounted along said conveyor means and positioned between said layers of cloth and supporting said cloths, said supporting means having a pair of elongated members in substantially spaced parallel relation extending along said conveyor means, means securing said support means in proximity of said sewing machine at a position prior to the needle sewing said seam, said elongated members being positioned between said layers of cloth on either side of said seam, spreading means mounted on one of said elongated members in the path of said seam separating the seam plies and positioning said seam plies in a plane and substantially at right angle to that of said cloths, and folding means mounted in proximity to said spreading means folding said separated seam plies on the cloth thereby forming four superimposed layers of cloth extending from said seam.

4,016,823

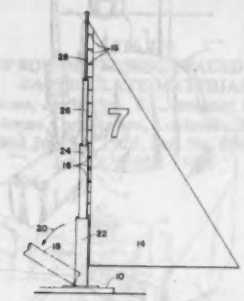
RETRACTABLE SAILBOAT MAST

Robert S. Davis, 405 W. 3rd St., Homer, Ill. 61849

Filed May 21, 1976, Ser. No. 688,597
Int. Cl.² B63B 15/00
U.S. Cl. 114—90 9 Claims

1. A retractable sailboat mast comprising a plurality of tubular elements telescopingly slidingly engaged within one another, detenting means for compressively releasably detenting adjacent tubular elements when said adjacent tubular

elements are extended outwardly from one another along a common longitudinal axis thereof, aligning means for rotationally aligning said plurality of tubular elements to one another, each of said plurality of tubular elements having a slot in the walls thereof, the longitudinal axis of said slot extending parallel to said common longitudinal axis, said slot



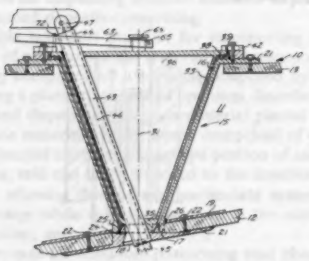
of said each of said plurality of tubular elements co-axially aligned, sail supporting means for providing lateral support to a sail, said sail supporting means positioning a portion of said sail adjacent said slot, mast supporting means for removably and pivotably securing said retractable sailboat mast to a deck of a sailing vessel.

4,016,824

RUDDER POST TUBE ASSEMBLY

Olav Thyvold, 2891 Craigowan Road, Victoria, British Columbia, Canada (V9B 1M9)

Filed Oct. 14, 1975, Ser. No. 622,378
Int. Cl.² B63H *25/06*
U.S. Cl. 114—165 **5 Claims**



1. A rudder tube assembly for sailing craft comprising:
a. a cylindrical rudder post tube for rotatably supporting a rudder post of a rudder assembly,
b. means for mounting the tube in the craft for rotation such that the tube axis describes, when rotated, at least a portion of the curved surface of an inverted cone having an axis lying in the longitudinal vertical plane of the craft for enabling the rudder post to be angularly oriented relative to said plane,
c. means for releasably locking the tube against rotation.

4,016,825

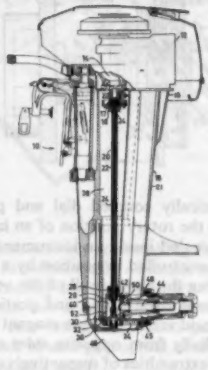
DEVICE FOR DRIVING A BOAT PROPELLER AND COOLING WATER PUMP

Heinz Pichl, Bergfallsvagen 3, Uppsala 75256, Sweden

Filed Sept. 30, 1975, Ser. No. 618,130
Int. Cl.² B63H *21/26*
U.S. Cl. 115—17 **15 Claims**

1. A power device for a propeller and a cooling water pump in an outboard motor comprising a crankshaft and an intermediate shaft for driving a propeller shaft, characterized in that between the crankshaft and the intermediate shaft is arranged a reversible gear device, in that the intermediate shaft is hollow and in that a pump shaft for powering a cooling water pump impeller is rigidly attached to the crankshaft and rotatably passes through the hollow intermediate shaft.

10. In an upright power leg for a boat drive comprising a housing including an upper end portion, an intermediate portion and a lower propeller housing portion, an intermediate shaft in said housing having an upper end and extending downwardly from its upper end through said intermediate portion and having a lower end disposed in said lower housing portion, a propeller shaft in said lower housing portion, gear means in said lower housing portion drivingly connecting said propeller



shaft to said lower end of said intermediate shaft, a motor drive shaft in said upper end portion, and forward and reverse gear means in said housing connecting said drive shaft to said upper end of said intermediate shaft, the combination of a cooling water pump impeller disposed in said lower housing portion, and a pump shaft directly connected in said upper end portion to said motor drive shaft and extending through said intermediate portion of said housing and drivingly connected to said water pump impeller.

4,016,826

WATER SPIDER

David H. Sanders, Hamlin, Tex., assignor to M. H. Sanders et al., Hamlin, Tex.

Filed Apr. 5, 1976, Ser. No. 673,714
Int. Cl.² B63H *16/00*
U.S. Cl. 115—26 **20 Claims**

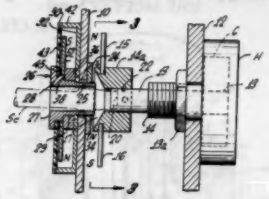
1. A water vehicle comprising:
a. two crank shafts,
b. each crankshaft having
i. axle stubs on each end, and
ii. two cranks arranged port and starboard between the axle stubs,
iii. the cranks having an opposed throw from the axle stub,
c. treadle boards arranged one port and one starboard,
d. the port treadle board journaled to the port crank of each crankshaft,
e. the starboard treadle board journaled to the starboard crank of each crankshaft,
f. a float mounted on each axle stub, and
g. each float having an outboard face thereon, and
h. paddles on said outboard face of each float.

4,016,827

MAGNETICALLY COUPLED INDICATOR MEANS FOR CONTROL SETTING

James F. Lawrence, Jr., 13161 Barrett Hill Circle, Santa Ana, Calif. 92705

Filed Sept. 12, 1975, Ser. No. 612,930
Int. Cl.² H01C 1/01
U.S. Cl. 116—129 D **2 Claims**



1. In a magnetically coupled dial and pointer indicator adapted to reveal the rotary position of an instrument circuit control rotor concealed inside an instrument vessel mounted on a support and controlled in position by a rotatably adjustable shaft extending through a wall of the vessel,

bar magnet means fixed on an end portion of said shaft, exteriorly of said vessel, said bar magnet means extending generally radially from opposite sides of said shaft and having outer extremities of respectively opposite polarity, said bar magnet means being configured and oriented to have a magnetic circuit producing a magnetic flux loop extending between said extremities and having an intermediate region thereof extending substantially unidirectionally transversely across the prolonged axis of said shaft, generally perpendicularly thereto,

a non-magnetic indicator housing for said pointer indicator spacedly fixed with respect to said instrument vessel, with a back, and a transparent cover, said housing being positioned with its back facing said end portion of said shaft, said housing being so positioned relatively to said end portion of said shaft and said extremities of said bar magnet means that said intermediate region of said flux loop is substantially contained inside said housing,

said pointer indicator comprising a longitudinally magnetized pointer in said housing,

means on said housing mounting said pointer to rotate freely on an axis generally aligned with said shaft, and in a plane generally perpendicular to such axis, within said intermediate region of said flux loop,

a fixed calibrated scale associated with said housing and cooperable with said pointer; and

said pointer and housing having a passageway therethrough, aligned with said shaft, to provide for extending a tool therethrough to engage and rotate said shaft.

4,016,828

APPARATUS FOR BLOOD FILM PREPARATION

Francis William Maher, Jr., Milford, and Vladimir Valentine Pirc, Norwalk, both of Conn., assignors to The Perkin-Elmer Corporation, Norwalk, Conn.

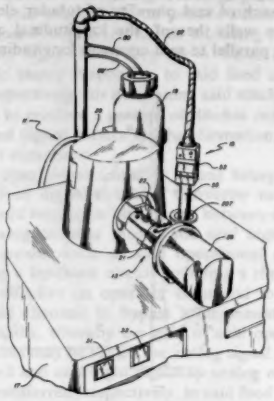
Filed Mar. 22, 1976, Ser. No. 669,015
Int. Cl.² B05C 11/08
U.S. Cl. 118—6 **27 Claims**

1. Apparatus for preparing a thin film of blood on a planar substrate for diagnostic evaluation comprising:

a. means defining an enclosed chamber;

b. spinning means disposed within said chamber and adapted to receive a substrate on which a blood specimen is deposited; and

c. means for providing a curtain of flowing liquid within said chamber surrounding said substrate while spinning whereby blood particles and aerosol thrown from said



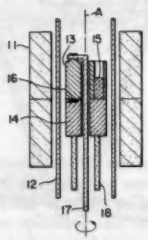
substrate will be intercepted and collected by said liquid curtain.

4,016,829

APPARATUS FOR CRYSTAL GROWTH

Kazuhiro Ito; Yuichi Ono; Kiichi Ueyanagi, all of Hachioji; Makoto Morioka, and Masao Kawamura, both of Tokyo, all of Japan, assignors to Hitachi, Ltd., Japan

Filed Feb. 26, 1974, Ser. No. 445,898
Claims priority, application Japan, Feb. 26, 1973, 48-22072
Int. Cl.² B01J 17/04
U.S. Cl. 118—64 **12 Claims**



1. An apparatus for crystal growth in the liquid phase comprising:

an electric furnace means for producing temperature differences vertically and for providing a plurality of isothermal curved planes vertically spaced from each other within said furnace;

a reactor defining a chamber which is within and is heated by said electric furnace;

a jig assembly means which is set in said reactor chamber and which includes an upper part and a lower part, the lower part being fixed and being arranged to hold on its upper surface a plurality of substrates, said lower part having means for positioning said substrates whereby a planar surface of each of said substrates on which the liquid phase crystal growth is to be made extends tangentially to an isothermal plane, said means for positioning said plurality of substrates including means for positioning the planar surface of at least one substrate aslant with respect to any position perpendicular or parallel to the vertical axis of said jig assembly means or to the center plane defined between the upper and lower parts of the

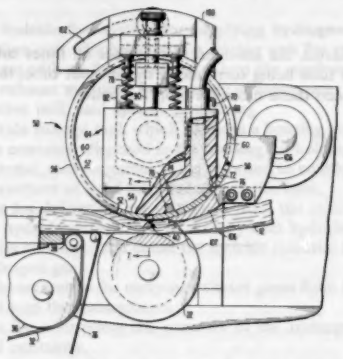
jig assembly means, and the upper part having reservoir means for containing a solution for crystal growth; and control means to bring the solution for the growth in said reservoir means of said upper part into contact with said planar surface of each of said substrates and then to separate said solution and said planar surface.

4,016,830

APPARATUS FOR DISPENSING SPACED DEPOSITS OF PARTICULATE MATERIAL

John H. Sexstone, Anchorage, Ky., assignor to Brown & Williamson Tobacco Corporation, Louisville, Ky.

Filed July 16, 1975, Ser. No. 596,374
Int. Cl.² B05C *19/00*
U.S. Cl. 118—406 **23 Claims**



1. Apparatus for dispensing metered amounts of particulate material in spaced deposits comprising:

a. a rotatable transport member for transporting discrete amounts of said particulate material, said transport member being comprised of a vertically disposed cylindrical rim having a plurality of spaced openings therethrough to receive and dispense particulate material placed therein;

b. particulate material supply means comprised of a downwardly directed chamber engaging a portion of said cylindrical rim, said rim being exposed to the interior of said chamber allowing flow of said particulate material into said openings while said openings are in the confines of said chamber; and

c. control means for rotatably positioning said chamber in relation to the interior of said cylindrical rim to selectively alter the flow of particulate material from said chamber into said openings.

4,016,831

APPARATUS FOR APPLYING A FOAM BACKING TO FABRIC

Forrest T. James, Burlington, and Stephen L. Guy, Greensboro, both of N.C., assignors to Burlington Industries, Inc., Greensboro, N.C.

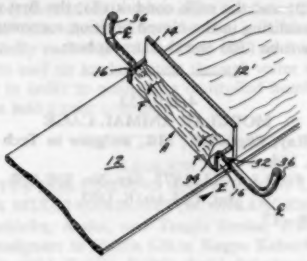
Filed Apr. 7, 1975, Ser. No. 565,704
Int. Cl.² B05C *3/18*
U.S. Cl. 118—415 **6 Claims**

1. Apparatus for applying a foam coating to a fabric to provide a backing therefor, comprising

a. means for defining a fluid-foam pillow of a predetermined volume on a web of fabric to be backed, the volume having a top, bottom, front, back, and two sides, and said means for defining the fluid-foam pillow comprising means for confining the front and sides of the pillow, the fabric web supporting the bottom of the pillow,

b. means for passing fabric of said web past said foam pillow, said pillow generally rolling about an axis which is transverse with respect to said web as said fabric web is moved with respect thereto,

c. means for allowing only a portion of the foam in said pillow to pass with said web as it moves past said pillow, and



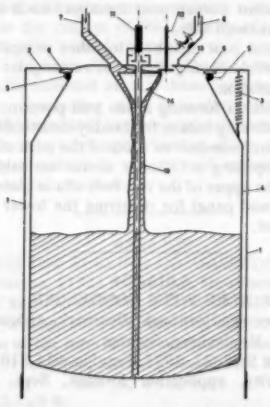
d. means for continuously replenishing the foam material in said pillow to substantially maintain said predetermined volume thereof by introducing a flow of foam into said pillow at least two spaced points in the interior of said pillow, said flow being introduced generally along said transverse axis of said pillow, one of said points being on either side of said pillow.

4,016,832

APPARATUS FOR DETERMINING THE QUANTITY OF MILK AND FOR DRAWING A SAMPLE DURING THE MILKING OF COWS

Philippus Pope Kiestra, Uilensprong 17, De Tijnje, Netherlands

Filed Sept. 4, 1975, Ser. No. 610,265
Claims priority, application Netherlands, Sept. 6, 1974, 7411888
Int. Cl.² A01J *9/00*
U.S. Cl. 119—14.14 **4 Claims**



1. An apparatus for determining the quantity of milk and for drawing a milk sample during the milking of cows, characterized by a frame (1) having an upper wall (2), an upwardly open milk container (4) being suspended by means of springs (3) to the lower surface of said upper wall, which container is engageable by its upper edge (5) via a seal (6) against the upper wall of the frame, said upper wall having two connections (7, 8) within the upper edge of the milk container, which are adapted for connection (7) to the hose of a milking cluster and to the milk conduit (8) respectively, two valves (11, 12)

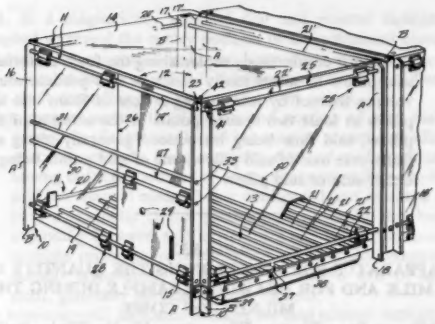
being provided at the position of the connection to the milk conduit, one valve (11) controlling the connection between a tube (10) extending from the upper wall (2) of the frame within the container (4) to close to the container bottom and the milk conduit (8) and the other valve (12) controls the connection between the volume in the container (4) outside the tube (10) and the milk conduit (8), the first-mentioned valve (11) realizing in the closed position a connection (16) between the tube (10) and the atmosphere.

4,016,833

MODULAR ANIMAL CAGE

Ronald C. Ray, Edgewater, Md., assignor to Tech Serv Inc., Beltsville, Md.

Filed July 24, 1975, Ser. No. 598,870
Int. Cl.² A01K *1/02*
U.S. Cl. 119—17 **10 Claims**



1. A modular animal cage comprising
a. four elongated upstanding corner post members,
b. eight rods arranged in sets of two, said two rods of each set being vertically spaced from each other to provide an upper rod and a lower rod, and extending generally horizontally between and connecting a corner post member to an adjacent corner post member, each set of rods forming a skeletal side,
c. said rods and post members together comprising a first skeletal module having a general rectangular prism outline configuration,
d. a panel member forming a side wall portion, and
e. resilient fastening means for readily detachably connecting said panel member to each of the rods of a set, said means comprising a fastener device on said panel for receiving the upper of the two rods of a set, and a fastener device on said panel for receiving the lower of the two rods of a set.

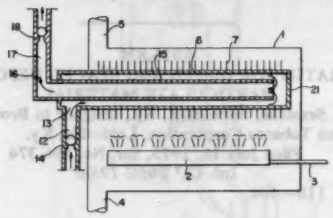
4,016,834

BOILER WITH CONDENSER

Poul Wilfred Jensen, Hornbaek, Denmark, assignor to AGA Radiator AB, Helsingborg, Sweden

Filed Sept. 22, 1975, Ser. No. 615,510
Claims priority, application Sweden, Sept. 27, 1974, 7412220
Int. Cl.² F22B *15/00, 23/02*
U.S. Cl. 122—264 **19 Claims**

1. An arrangement for the heating of a liquid, a liquid mixture or a liquid suspension to boiling and for the condensation of steam created during the boiling, comprising:
a heating means,
a boiler arranged to receive heat from the heating means, said boiler having an inlet opening,
a condenser having an inlet and an outlet, said condenser inlet being located in the boiler and in open communication with the interior of the boiler such that fluid entering the boiler inlet flows at least part of the way through the boiler before entering the condenser inlet,
and including flow directing means for directing the fluid in the direction from the boiler inlet through the boiler and into and through the condenser,



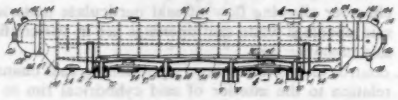
and wherein the condenser comprises an inner tube, said inner tube being surrounded by an outer tube, the space between these tubes forming the boiler.

4,016,835

MOISTURE SEPARATOR-REHEATER

Abraham L. Yarden, and Robert A. Weisberg, both of Los Angeles, Calif., assignors to Southwestern Engineering Company, Los Angeles, Calif.

Filed Aug. 1, 1975, Ser. No. 601,079
Int. Cl.² F22G *1/00*; F28F *13/00*
U.S. Cl. 122—483 **19 Claims**

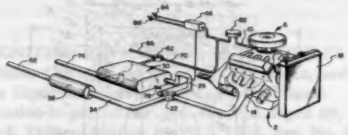


1. A moisture separator-reheater comprising
a cylindrical, horizontally disposed shell;
inlet means at the bottom of said shell for receiving moisture laden steam into said shell;
outlet means at the top of said shell for discharging dried, heated steam from said shell;
at least one tube bundle extending longitudinally through an upper portion of said shell;
drainage means extending longitudinally and centrally through a lower portion of said shell;
a plurality of moisture separators extending in two banks longitudinally through said shell, said banks diverging from said drainage means upwardly to each side of said tube bundle;
baffle means for dividing flow through said inlet means toward each bank of said separators; and
flow distribution means for directing the divided flow longitudinally through said shell, each flow distribution means including a plurality of plates perpendicular to the divided flow, said plates being staggered to separately direct portions of the divided flow at different levels along the banks of said separators.

4,016,836
HYDRIDE FUEL SYSTEM

Donald B. MacKay, Spanish Fork; Brian C. Nielson; Dale L. Henriksen, both of Orem; Roger Evan Billings, Provo; Harold M. Simons, Orem, and Paul P. Hindmarsh, Provo, all of Utah, assignors to Billings Energy Research Corporation, Provo, Utah

Filed Sept. 8, 1975, Ser. No. 611,229
Int. Cl.² F02B *43/00*
U.S. Cl. 123—3 31 Claims



1. A hydride fuel system for supplying hydrogen gas to a combustion unit which includes a mixing unit for mixing hydrogen gas with air for introduction into the combustion unit, and an exhaust manifold for carrying exhaust gases from the combustion unit, said system comprising

a hydride storage tank which includes a housing and at least one container disposed in the housing for holding hydride material, said container being disposed to enable the flow thereabout of fluid introduced into the tank,

means for delivering exhaust gases from the manifold into the hydride storage tank to thereby heat hydride material in the container and cause the hydride material to release hydrogen gas,

an exhaust system for carrying exhaust gases from the manifold into the atmosphere,

means for controlling the pressure of the hydrogen gas in said container,

means for conveying hydrogen gas from the container to the mixing unit,

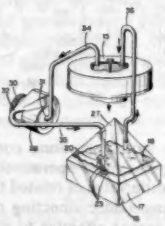
means for introducing hydrogen gas into the container, and

means for discharging exhaust gases from the hydride storage tank.

4,016,837
VAPOR INTAKE SYSTEM FOR INTERNAL COMBUSTION ENGINES

Fred A. Wentworth, Jr., 20 Heights Road, Stratham, N.H. 03885

Continuation-in-part of Ser. No. 430,252, Jan. 2, 1974, Pat. No. 3,867,819. This application Oct. 17, 1974, Ser. No. 515,527
Int. Cl.² F02D *19/00*
U.S. Cl. 123—25 R 8 Claims



1. In an internal combustion engine having an air intake system, an output drive system and a vapor generating system for adding water vapor to the air intake system, the improvement in said vaopr generating system comprising:

a. blower means having an inlet connection and an outlet connection;

b. a closed container for water;

c. a first conduit having a first end connected to said outlet connection and a second end connection to a pipe extending below water level in said container;

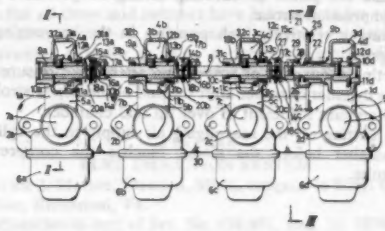
d. a second conduit having a first end connected to said container above water level and a second end connected to the air intake system of said engine; and,

e. a third conduit having a first end connected to the air intake system of said engine and a second end connected to said inlet connection, whereby said blower means repeatedly recirculation air from said air intake system back to said air intake system through water in said container in order to maintain a controlled humidity condition in said intake system.

4,016,838
APPARATUS FOR OPENING AND CLOSING CONTROL OF A MULTI-CARBURETOR ARRANGEMENT

Yuichi Yoshioka, Asaka, and Tsugio Sanka, Wako, both of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha and Kabushiki Kaisha Keihin Seiki Seisakusho, both of Tokyo, Japan

Filed Feb. 18, 1976, Ser. No. 658,993
Claims priority, application Japan, Feb. 20, 1975, 50-22506[U]
Int. Cl.² F02M *13/04*
U.S. Cl. 123—59 PC 9 Claims



1. Apparatus for the opening and closing control of a plurality of carburetors each having a respective casing containing a throttle valve, said apparatus comprising a simple drum shaft extending in the casings of the plurality of carburetors and rotatable therein, a single common valve operation member coupled to said drum shaft for turning the same, a plurality of throttle shafts mounted on said drum shaft in respective casings, means connecting each of said throttle shafts to the respective throttle valve in the associated carburetor for operating the throttle valve upon turning of the drum shaft, and two bearing members in two of said carburetors rotatably supporting said drum shaft.

4,016,839
METHOD FOR FUELING COMBUSTION ENGINES

Clyde M. Morton, 11525 S. Ramona, Hawthorne, Calif. 90250

Division of Ser. No. 547,790, Feb. 7, 1975. This application Aug. 14, 1975, Ser. No. 604,498
The portion of the term of this patent subsequent to Feb. 17, 1993, has been disclaimed.
Int. Cl.² F02B *1/08*
U.S. Cl. 123—69 R 48 Claims

1. A method of fueling a two stroke internal combusion engine which has a cylinder chamber and piston therein productive of a combustion area when the piston is at top dead center, and wherein the piston is reciprocatably mounted in the chamber for operation through a power stroke and a compression stroke, means for introducing a fuel-air mixture supply adjacent one end of the chamber, means for introducing a scavenging air supply adjacent the other end of the chamber and an exhaust means from said chamber,

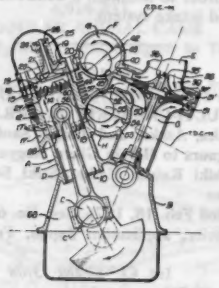
said method comprising sequentially providing supplies

respectively of voltatile, cold, gaseous fuel-air mixture and scavenging air for the cylinder chamber at an initial pressure, greater than atmospheric

creating a pressure in the cold gaseous fuel-air mixture supply relatively higher than said initial pressure,

trapping a charge of the cold gaseous fuel-air mixture under said relatively higher pressure in an amount sufficient to drive the piston through the power stroke,

releasing said cold gaseous fuel-air mixture to the cylinder chamber when the piston is at bottom dead center and



while the piston is traveling through a portion of the compression stroke,

creating a relatively high pressure in the scavenging air supply,

injecting a quantity of scavenging air under pressure into the cylinder chamber after the end of the power stroke in an amount sufficient to over fill said chamber,

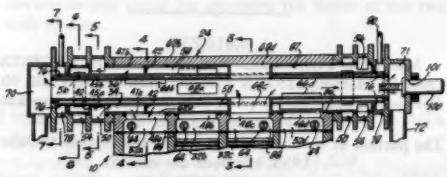
then cutting off the scavenging air supply to the cylinder chamber before the piston reaches the compression stroke.

4,016,840

ROTARY-VALVE DEVICE FOR INTERNAL-COMBUSTION ENGINES

John E. Lockshaw, 519 Las Riendas Drive, Fullerton, Calif. 92635

Filed May 5, 1975, Ser. No. 574,236
Int. Cl.² F02M *25/06*
U.S. Cl. 123—75 B **13 Claims**



1. A single rotary-valve device for a four stroke internal-combustion engine, arranged to simultaneously release separate rich and lean fuel mixtures therefrom into each combustion chamber of said engine, wherein the device comprises:

an elongated tubular drum defined by an outer wall housing;

an exhaust-manifold means disposed within said tubular drum for rotation therewith;

a fuel-intake system disposed in said drum and having a rich-fuel-intake means and a lean-fuel-intake means;

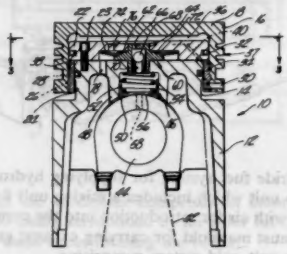
a cooling means positioned between said exhaust-manifold means and said fuel-intake system.

4,016,841

VARIABLE COMPRESSION RATIO PISTON

Albert M. Karaba, Muskegon; Alexander P. Brouwers, Bloomfield Hills, and Thomas J. Pearsall, Grand Haven, all of Mich., assignors to Teledyne Industries, Inc., Los Angeles, Calif.

Filed Sept. 10, 1975, Ser. No. 611,863
Int. Cl.² F02B *75/04*
U.S. Cl. 123—78 B **15 Claims**



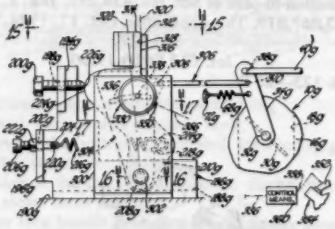
1. In an internal combustion engine, a piston having an inner and an outer member telescopically received by said inner member, said members being movable in response to reciprocation of the piston with respect to a combustion chamber of the engine, a first fluid chamber and a second fluid chamber varying in volume in response to said relative movement and to variations in the quantity of fluid therein, means supplying fluid to said chambers, said means comprising a first passage in said piston connecting with said first fluid chamber, a one way inlet valve disposed in said first passage and a second unrestricted passage in said piston directly connecting said first chamber with said second chamber said second passage being the only means of communication between said first chamber and said second chamber.

4,016,842

RESILIENT THROTTLE STOP MEANS

Milton J. Kittler, 6701 Kasba Circle, Scottsdale, Ariz. 85253

Filed Nov. 8, 1974, Ser. No. 522,236
Int. Cl.² F02D *11/02*; G05G *5/04*
U.S. Cl. 123—98 **12 Claims**



1. Resilient throttle stop apparatus, comprising resilient means, and connecting means for operatively connecting said resilient means to a throttle valve of related throttle controlled induction passage means, said connecting means comprising functional lost-motion means effective to cause said resilient means to exhibit added resilient resistance to further opening movement of said throttle valve by associated throttle lever means after said throttle valve has been opened to a preselected degree, said resilient means comprising spring means, said spring means being preloaded as to cause said added resilient resistance to be of a preselected minimum value upon initiation of said further opening movement, and further comprising second lever means, pivot means carrying said second

lever means, said connecting means operatively interconnecting said throttle lever means and said second lever means, said spring means having one end thereof operatively connected to said second lever means and an other end thereof operatively connected to a stationary spring seat, said connecting means being effective to cause rotation in a first direction of said second lever means upon said initiation of said further opening movement, and said spring means being effective to resiliently resist rotation of said second lever means in said first direction.

4,016,843

IGNITION DEVICES FOR AUTOMOBILES

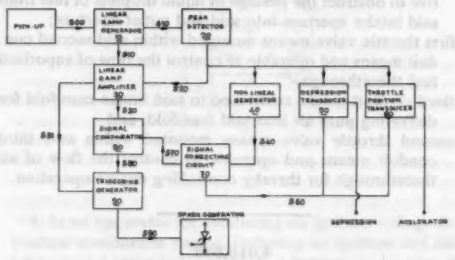
Juan Antonio Castaños Dorrego, Madrid, Spain, assignor to Fabrica Espanola Magnetos, S.A., Madrid, Spain

Continuation-in-part of Ser. No. 461,918, April 18, 1974, abandoned. This application May 23, 1975, Ser. No. 580,336

Claims priority, application Spain, Feb. 20, 1974, 423432

Int. Cl.² F02P 5/04; F02B 3/00

U.S. Cl. 123—117 R **3 Claims**



1. An electronically controlled ignition system for obtaining optimum spark advance comprising:

a. a transducer means which continuously monitors engine speed and generates electrical pulses having a frequency proportional to the engine speed;

b. a first ramp generating means for translating said electrical pulses to a first electrical signal having constant slope and an amplitude proportional to the period between said electrical pulses;

c. a peak detecting means for sampling said first electrical signal, detecting the peak voltage thereof, and emitting a second electrical signal carrying engine speed information in the form of a squared signal;

d. a non-linear function generator means having stored therein predetermined optimum spark advance information relative to engine speed for sampling and modifying said second electrical signal to emit a third electrical signal having therein said peak voltages adjusted by said predetermined spark advance information;

e. a signal comparing means for comparing said first and third electrical signals and emitting a fourth signal in the form of a pulse at such times as the voltages of the first and third electrical signals are equal; and

f. a spark generating means activated responsive to said fourth signal.

4,016,844

OPERATION CONTROL SYSTEM FOR VEHICLE ENGINE

Minoru Tanaka, Chohu; Akihisa Nakamura, Tokyo, and Hisakazu Fushimi, Saitama, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

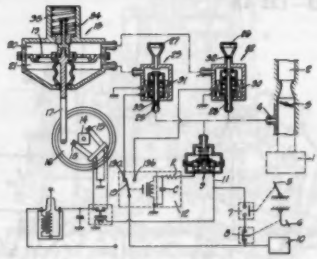
Filed July 8, 1975, Ser. No. 594,037

Claims priority, application Japan, July 10, 1974, 49-78211; July 17, 1974, 49-81148

Int. Cl.² F02P 5/02

U.S. Cl. 123—117 A **3 Claims**

1. In a spark ignition timing control system for an internal combustion engine driving a vehicle, the engine having an intake passage, a throttle valve in the intake passage, and a distributor having a movable spark adjusting member, the vehicle having a brake actuator and having a throttle control member for the engine, the improvement comprising, in combination: a cruising detector serving to detect cruising of the vehicle, said detector including a first electrical switch opened by actuation of the brake actuator, a second electrical switch



closed by actuation of the throttle control member, a third electrical switch closed by a strong vacuum condition in the intake passage downstream from the throttle valve, and time delay means, all three said switches and said time delay means being connected in series, said cruising detector being operated after all three said switches have been closed for a predetermined time interval, and means responsive to operation of said cruising detector to cause the movable spark adjusting member to advance the spark.

4,016,845

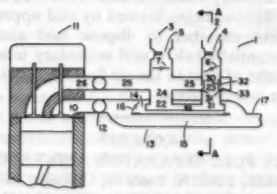
FUEL INDUCTION SYSTEM

Frederick J. Marsee, Clawson, Mich., assignor to Ethyl Corporation, Richmond, Va.

Continuation-in-part of Ser. No. 498,951, Aug. 20, 1974, and Ser. No. 508,087, Sept. 23, 1974, Pat. No. 3,972,324, and Ser. No. 498,960, Aug. 20, 1974, Pat. No. 3,971,352, which is a continuation-in-part of Ser. No. 439,912, Feb. 6, 1974, abandoned. This application Oct. 20, 1975, Ser. No. 624,730

Int. Cl.² F02M 31/00

U.S. Cl. 123—122 AC **9 Claims**

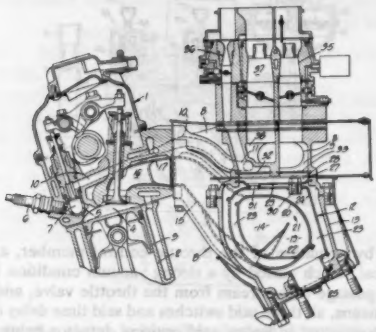


1. A spark-ignited multicylinder internal combustion engine having improved cylinder-to-cylinder fuel distribution and cold starting ability, said engine comprising means for atomizing gasoline into a carburetor barrel, intake passage means for delivering air/fuel mixture to each of said multi-cylinders, an enclosed container having an inlet and an outlet, first passage means connecting said carburetor barrel to said inlet, second passage means connecting said outlet to said intake passage means, liquid fuel trap means inside said first passage means adapted to trap liquid fuel running down the inside wall of said first passage means, said first passage means having at least one small opening in said inside wall, said small opening forming a passage from said trap means into said intake passage means whereby liquid fuel passes directly, without passing through heating means, from said trap means into said intake passage means by-passing said container.

4,016,846
INTAKE AND EXHAUST MANIFOLD SYSTEM FOR INTERNAL COMBUSTION ENGINE

Soichi Nakano, Kawagoe; Yasumichi Ohama, Mitaka, and Masao Watanabe, Asaka, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed July 16, 1975, Ser. No. 596,469
Claims priority, application Japan, July 18, 1974, 49-81693
Int. Cl.² F02M *31/08*; F02B *19/10*
U.S. Cl. 123—122 AB 4 Claims

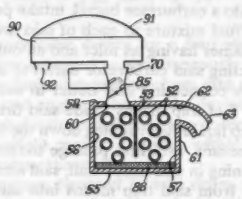


1. In a multi-cylinder internal combustion engine of the type having an auxiliary combustion chamber associated with each main combustion chamber and connected thereto by a torch opening, the improvement comprising, in combination: an intake manifold including a primary intake chamber having a lower wall, a secondary intake chamber having a lower wall, and an auxiliary intake chamber having upper and lower walls, means to supply air-fuel mixture to said intake chambers, first passage means for connecting said primary and secondary intake chambers to the main combustion chambers, second passage means for connecting the auxiliary intake chamber to the auxiliary combustion chambers, an exhaust manifold disposed below said intake manifold and including a housing having walls defining an upward facing opening, said lower wall of said primary intake chamber and said lower wall of said auxiliary intake chamber being in heat exchange relationship with said housing opening, whereby exhaust gases within said housing act to heat the air-fuel mixtures in said primary chamber and said auxiliary chamber, said lower wall of said secondary intake chamber being formed by said upper wall of said auxiliary intake chamber to dispose said auxiliary intake chamber substantially below said secondary intake chamber, whereby transfer of heat to the air-fuel mixture in said secondary chamber is minimized.

4,016,847
INERTIA FUEL SEPARATOR AND VAPORIZER

Frank J. Rychlik, 5200 N. Reserve, Chicago, Ill. 60656

Filed Jan. 16, 1975, Ser. No. 541,632
Int. Cl.² F02M *31/00*
U.S. Cl. 123—122 AA 3 Claims



1. A fuel/air induction system for an internal combustion engine having a plurality of combustion cylinders compising:

an intake manifold for distributing a fuel/air mixture to the engine cylinders;

a downdraft carburetor for delivering an enriched fuel/air mixture to said manifold;

a heated vaporization chamber having a top member, side members, and a bottom member, and having said top member formed with an intake aperture to allow the fuel air mixture to enter the chamber for vaporizing liquid fuel contained therewithin a plurality of heat exchange tubes mounted within said chamber and extending between said side members and adapted to be connected to an exhaust gas heat source of said internal combustion engine;

first conduit means connected to said intake aperture for supplying fuel from said carburetor into said chamber said chamber also having one side member formed with an outlet aperture near said top member;

second conduit means connected to said outlet aperture to deliver vaporized fuel from said chamber to said intake manifold;

baffle means mounted within said chamber and extending between said side members and from said top member nearly to the bottom member of said chamber and effective to obstruct the passage of liquid droplets of fuel from said intake aperture into said and outlet aperture;

first throttle valve means mounted within said second conduit means and operable to control the flow of vaporized fuel therethrough;

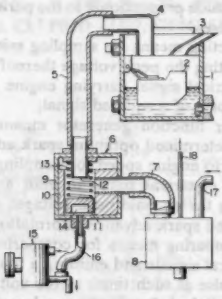
third conduit means connected to said intake manifold for delivering pure air into said manifold; and

second throttle valve means mounted within said third conduit means and operable to control the flow of air therethrough for thereby controlling engine operation.

4,016,848
AIR-VENT SYSTEM FOR A CARBURETOR

Takanori Nagai, Toyota, Japan, assignor to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan

Filed May 29, 1975, Ser. No. 581,732
Claims priority, application Japan, Jan. 31, 1975, 50-13014
Int. Cl.² F02M *37/00*
U.S. Cl. 123—136 3 Claims



1. A vent system for a float chamber of a carburetor comprising a carburetor housing portion defining a float chamber therein, a vent port provided in said housing portion, a fuel vapour absorptive vessel-like charcoal cannister having inlet and outlet ports, a control valve having inlet and outlet ports, a first passage means which connects said vent port to said inlet port of said control valve, a second passage means which connects said outlet port of said control valve to said inlet port of said fuel vapour adsorptive vessel, and an air pump provided with a delivery port and driven by an associated engine which operates with said carburetor, said control valve defining a through passage therein which connects said inlet and outlet ports thereof and having a valve element which selectively tranverses said through passage to substantially inter-

cept said through passage, an air chamber means which is connected with the delivery port of said air pump and biases said valve element to traverse and close said through passage when it is supplied with air pressure above a predetermined level, and a spring means which biases said valve element toward an open position to counter-act said air chamber means.

4,016,849

APPARATUS FOR INCREASING THE IGNITION VOLTAGE OF INTERNAL COMBUSTION ENGINES

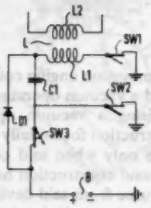
Peter Pan Lei, Taipei, Taiwan, China /Taiwan, assignor to Gerd Krommes, Wuppertal, Germany

Filed June 23, 1975, Ser. No. 589,414

Claims priority, application Germany, June 25, 1974, 2430389; July 22, 1974, 2435159

Int. Cl.² F02P *1/00*; H05B *37/02*

U.S. Cl. 123—148 DC **11 Claims**



1. In an apparatus for producing an ignition voltage for an internal combustion engine, including an ignition coil having primary and secondary windings, a battery, and a circuit including ignition switching means connecting said battery to said primary winding, said ignition switching means being connected in series with said primary winding in said circuit; the improvement wherein said circuit further comprises a capacitor, means for connecting said capacitor in series with said battery when said ignition switching means are open, for charging said capacitor, and means for connecting said capacitor in series with said battery, primary winding and ignition switching means when said ignition switching means are closed, whereby the sum of the voltage of said battery and the voltage across the capacitor is applied to said primary winding, resulting in increased current flow in said primary winding and thereby increased storage of magnetic energy in said ignition coil for increasing the voltage storage of said ignition coil when said ignition switching means is opened.

4,016,850

PORTED CYLINDER CONSTRUCTION FOR A TWO-CYCLE ENGINE

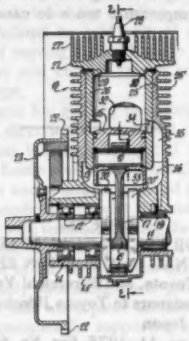
James L. Bloemers, Fond du Lac, Wis., assignor to Brunswick Corporation, Skokie, Ill.

Division of Ser. No. 444,767, Feb. 22, 1974. This application Mar. 7, 1975, Ser. No. 556,557

Int. Cl.² F02F *1/10*

U.S. Cl. 123—193 C **10 Claims**

1. A cylinder construction for a two-cycle engine utilizing crankcase compression of combustible mixture and side-ported exhaust, comprising a cylinder-body member having a cylindrical bore between a crankcase end and a head end, and having a side port between said ends, and a cylindrical sleeve-liner member closely fitted to the body-member bore and having an exhaust side port in registration with the side-port of said body member, said liner member having another side port intermediate said ends and offset from the exhaust side port, one of said members at its body-to-liner interface surface also having an elongate groove extending continuously between the region of said other side port and the crankcase end of said body member, whereby the groove defines with said body a



transfer passage for combustible mixture from the crankcase end to the bore of said sleeve liner.

4,016,851

SAFETY CONTROL METHOD AND DEVICE FOR LIMITING THE TEMPERATURE OF A FLUID TO A GIVEN UPPER VALUE

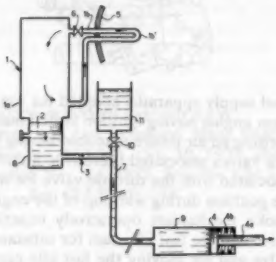
Jean Simon René Rouam, Puiseux-en-France, France, assignor to Societe d'Etudes de Machines Thermiques, Saint Denis, France

Filed Aug. 22, 1974, Ser. No. 499,530

Claims priority, application France, Sept. 6, 1973, 73.32201

Int. Cl.² F02B *77/08*

U.S. Cl. 123—198 D **17 Claims**



1. In an internal combustion engine including an exhaust manifold, a safety device for controlling the temperature of the exhaust gas in said exhaust manifold, comprising:

a pilot member forming a detecting sensor for measuring the exhaust gas temperature; a servo-motor operated by said pilot member and keyed in phase-locked relationship to this temperature; a control member operated by said servo-motor for adjusting a parameter conditioning said temperature, said pilot member being a dilatometer comprising a vessel filled with a liquid having a high boiling point and coefficient of thermal expansion, said vessel comprising a tank and piping mounted in by-passing relationship on said tank, one portion of said piping being located in the flow path of said exhaust gas the temperature of which is to be measured, said pilot member comprising an actuator-like element displaceable under the action of thermal expansion of said liquid; a hydraulic circuit relay connected to said dilatometer and to said servo-motor, said servo-motor comprising a hydraulic power ram actuator having a movable element, said movable element being displaceably operated by said hydraulic circuit relay and acting upon said control member, and said one portion of said piping being positioned inside of

the exhaust manifold of said engine; and means actuated by said control member for controlling fuel flow rate fed to said engine by reducing this flow rate as soon as the exhaust gas temperature tends to exceed a given upper limit value.

4,016,852

APPARATUS FOR PREVENTING AFTER-BURNING IN INTERNAL COMBUSTION ENGINE

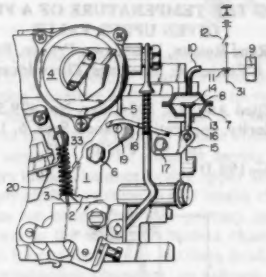
Masami Konishi, Toyota, and Hiromichi Yanagihara, Susono, both of Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan

Filed Aug. 11, 1975, Ser. No. 603,356

Claims priority, application Japan, Apr. 19, 1975, 50-048022

Int. Cl.² F02M *19/12*

U.S. Cl. 123—198 DB **7 Claims**



1. A fuel supply apparatus adapted for use with an internal combustion engine having ignition switch means, said apparatus comprising an air intake manifold having movable throttle and choke valves associated therewith, a fast idle cam operatively associated with the throttle valve for moving same into a fast idle position during warmup of the engine, and an automatic choke mechanism operatively coacting between the choke valve and the fast idle cam for substantially closing the choke valve and for moving the fast idle cam into a fast idle position during warmup of an engine, the improvement comprising control means operatively interconnected to said fast idle cam for forceably moving same away from said fast idle position to permit the throttle valve to be returned from its fast idle position into a substantially closed position upon stoppage of the engine when the automatic choke mechanism is set in a fast idle condition, said control means including pressure-responsive actuator means operatively connected with said fast idle cam, passage means communicating with said pressure-responsive actuator means for supplying a pressure fluid thereto to permit actuation thereof in response to the pressure level of said fluid, changeover valve means associated with said passage means to control the flow therethrough and being shiftable in response to opening and closing of the ignition switch means, first passageway means communicating said valve means with the surrounding atmosphere, and second passageway means communicating said valve means with said air intake manifold, whereby said valve means permits said pressure-responsive actuator means to selectively alternately communicate with said first and second passageway means so that actuation of said actuator means effects movement of said fast idle cam for permitting said throttle valve to be returned from its fast idle position to its closed position.

4,016,853

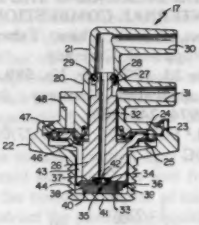
CONTROL SYSTEM AND IMPROVED PNEUMATICALLY OPERATED TEMPERATURE CONTROLLED VALVE CONSTRUCTION THEREFOR OR THE LIKE

Harley V. Bible, Maryville, Tenn., assignor to Robertshaw Controls Company, Richmond, Va.

Division of Ser. No. 499,176, Aug. 21, 1974, Pat. No. 3,963,042. This application Mar. 31, 1976, Ser. No. 672,523

Int. Cl.² F02P *5/04*

U.S. Cl. 123—198 R **10 Claims**



1. In an internal combustion engine control system having a source of vacuum and a vacuum operated control device, the improvement comprising a vacuum operated temperature controlled valve construction for initially interconnecting said source to said device only when said construction senses a certain temperature, said construction having means for only disconnecting said source from said device when the value of said source falls below a certain level thereof regardless of sensed temperature, said construction having temperature operated pilot valve means for actuating the same to an open condition thereof when said certain temperature is sensed.

4,016,854

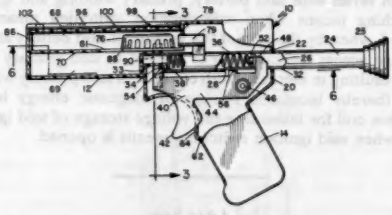
SPRING TYPE BOTTLE CAP PISTOL

James A. Lehman, 1312 - 12th Ave., San Diego, Calif. 92101

Filed Sept. 22, 1975, Ser. No. 615,567

Int. Cl.² F41B *15/00*

U.S. Cl. 124—27 **9 Claims**



7. A pistol for propelling projectiles comprising:

a projectile having bottle cap shape defining an inverted cavity with an annular downwardly extending peripheral wall;

a firing chamber receiving said projectile;

a handle connected to said firing chamber;

impeller means movably connected to said firing chamber and operative between a cocked position and through a firing stroke for imparting a propelling force on the projectile at the point of impact therewith;

compound spinning means operatively associated with said impeller means and active for imparting a spin to the projectile at the point of impact between said impeller means and the projectile, and active to apply a further spin producing force on the projectile as the same emerges from said firing chamber;

a trigger movably assembled to said handle means and operative for releasing said impeller means from said cocked position; and

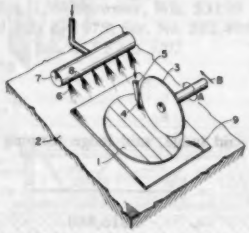
restraining means operatively connected to said trigger means and adapted for engaging and holding an inside surface of said peripheral wall of the projectile in said firing chamber until said trigger means is moved, and said restraining means then disengaging from the projectile to release the same for firing.

4,016,855

GRINDING METHOD

Tsutomu Mimata, Tokyo, Japan, assignor to Hitachi, Ltd., Japan

Filed Aug. 28, 1975, Ser. No. 608,733
Claims priority, application Japan, Sept. 4, 1974, 49-100920
Int. Cl.² B28D 1/04
U.S. Cl. 125—13 R 10 Claims



1. A method for segmenting a plate-like material into a plurality of individual pellets comprising the steps of:

a. forming grooves in the surface of said plate-like material by scribing said surface with a rotating grinder blade while causing washing fluid to flow over the entire surface of said plate-like material; and

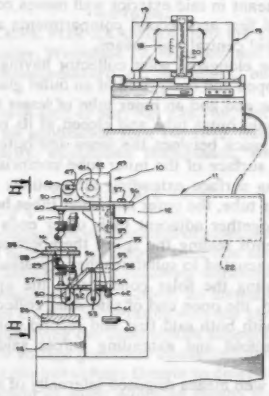
b. simultaneously with step (a), spraying a cooling fluid at the contact portion of said blade and the groove surface portion of said plate-like material.

4,016,856

WIRE CUTTING MACHINE

Howard B. McLaughlin, Hollywood, Calif., assignor to Laser Technology, Inc., N. Hollywood, Calif.

Filed Oct. 1, 1975, Ser. No. 618,519
Int. Cl.² B28D 1/08
U.S. Cl. 125—21 4 Claims



1. A machine for cutting a preselected shape in a work piece and having an elongate wire cutting member defining a cutting axis and adapted to be associated with a work table and a tool support frame comprising in combination;

means on the work table for holding a work piece in a cutting zone defined by said axis of said wire cutting member and for moving the work piece in X and Y directions relative to said cutting axis in accordance with a preselected shape;

means on the frame for guiding the elongate wire cutting member in a Z direction through said cutting zone;

said guiding means including elongated tubular members secured to said frame above and below the cutting zone of said work piece and rotatable grooved pulleys at ends of said tubular members adjacent the cutting zone of the work piece, the wire member passing through said tubular members and the bottom of the groove of the pulleys being tangential to the cutting zone axis;

and means pivotally mounting each pulley between the cutting zone of said work piece and the end of its associated tubular member for supporting said wire member to minimize lateral deflection of said wire member at the cutting zone,

said pivotal mounting means for each pulley including a drive wheel carried by said end of said associated tubular member and operably connected to a servo-drive means,

support means for said servo-drive means on said associated tubular member,

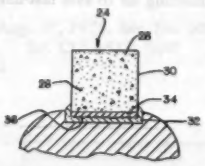
said servo-drive means and drive wheels associated therewith simultaneously and correspondingly turning said pulleys about the axis of said wire cutting member in accordance with the direction of movement of the work piece whereby said wire cutting member in the cutting zone is supported against lateral deflection of the wire member by the work piece.

4,016,857

EPOXY BOND DIAMOND SAW

George H. Hall, P.O. Box 244, Westford, Mass. 01886

Continuation of Ser. No. 513,716, Oct. 10, 1974, abandoned. This application Nov. 24, 1975, Ser. No. 634,828
Int. Cl.² B28D 1/08
U.S. Cl. 125—21 3 Claims



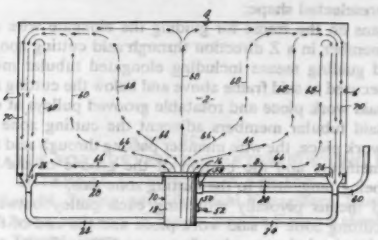
1. A wire saw comprising in combination:

an elongated metallic wire body of sufficient flexibility to be formed into a laterally flexible endless loop capable of being driven around at least a pair of sheaves;

a plurality of blocks of composite comminuted abrasive in a bonding matrix mounted in spaced-apart relation to one another along said body; and

a plurality of layers of flexible metal, each layer being metallurgically bonded to a corresponding one of said blocks and sandwiched between said body and said corresponding block so as to extend substantially completely between each of said corresponding blocks and said body, each of said layers being bonded to the periphery of said body by an elastically pliant, epoxy-based adhesive.

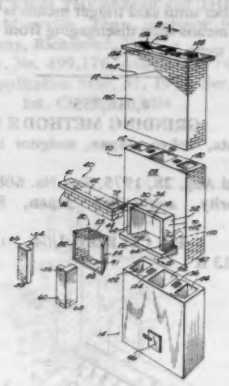
4,016,858
FLOOR FURNACE HEATING SYSTEM
Clifford A. Scogin, 427 Vassar, Sugar Creek, Mo. 64053
Filed July 10, 1975, Ser. No. 594,596
Int. Cl.² F24B 7/00
U.S. Cl. 126—116 B 3 Claims



1. A floor furnace comprising:
a. a housing open at top and bottom,
b. means operable to suspend said housing beneath the floor of a room space to be heated, in sealed communication with an aperture formed in said floor,
c. a power driven fan disposed operatively in the bottom opening of said housing and operable to delivery air upwardly through said housing,
d. a combustion chamber supported within said housing to form an annular air passage therebetween through which air delivered by said fan must travel,
e. means for burning fuel within said combustion chamber,
f. air directing means disposed within said air passage and operable to impart a horizontal whirling motion to air moving upwardly through said air passage as it is heated by said combustion chamber, whereby air emerging upwardly from said air passage and floor aperture into said room space is caused by centrifugal force to flow generally horizontally outwardly from said aperture over a major portion of the area of said room space, at or adjacent the floor thereof,
g. an outer housing of greater horizontal cross-sectional area than said first-named housing suspended from said floor aperture, and in which said first-named housing and said combustion chamber are in turn suspended, said outer housing extending below said first-named housing and being closed at its lower end,
h. means sealing the upper end of the air space between said outer and first-named housings, and
i. means for admitting air to said last-named air space.

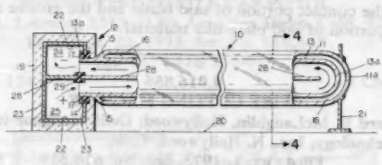
4,016,859
PRE-CAST FIREPLACE AND FLUE ASSEMBLY
Edmund A. Landowski, 1712 Spring St., Schofield, Wis. 54476
Filed Jan. 2, 1976, Ser. No. 645,973
Int. Cl.² F24B 1/18
U.S. Cl. 126—120 6 Claims

1. A preformed concrete fireplace comprising a chimney stack having a central flue, wall means defining a recess in said stack communicating with said flue, a hearth projecting outwardly from said stack section and above the bottom of the stack and said hearth together with said recess defining a combustion chamber including a ledge integrally formed with said stack section and projecting outwardly from said stack section above said hearth and wall means connecting said



hearth with said ledge, said ledge forming a support for a mantle.

4,016,860
TUBULAR SOLAR ENERGY COLLECTION SYSTEM UTILIZING AIR MEDIA
Kenneth L. Moan, Toledo, Ohio, assignor to Owens-Illinois, Inc., Toledo, Ohio
Filed Jan. 12, 1976, Ser. No. 648,355
Int. Cl.² F24J 3/02
U.S. Cl. 126—270 21 Claims



1. A solar energy collection apparatus comprising
a manifold having exterior wall means and a central internal wall means dividing it into separate first and second compartments,
aperture means in said exterior wall means communicating with said first and second compartments and extending across said central wall means,
at least one elongated solar collector having a closed end and an open end comprised of an outer glass tube closed at its one end and an inner tube of lesser O.D. than the I.D. of said outer tube and closed at its one end, there being a space between the inner and outer tubes, a peripheral surface of the inner tube comprising an energy absorbing surface extending substantially the length of the inner tube, the outer and inner tubes being integrally joined together adjacent their other ends opposite said closed ends sealing the space therebetween, said space being evacuated to subatmospheric pressure,
means sealing the solar collector in the aperture of the manifold, the open end of said solar collector communicating with both said first and second compartments of the manifold and extending across said central wall means,
elongated web means disposed internally of said inner tube of the solar collector, and substantially in registry with said central wall means of the manifold,
means sealingly connecting the end of said web means

adjacent the aperture to the central wall means, thereby connecting the first and second compartments of the manifold into the inner tube of the solar collector, the other opposite end of said web means extending axially into the inner tube and spaced from the closed end of the latter, whereby the first and second compartments of the manifold are connected to each other in the inner tube of the solar collector near the closed end thereof,

a gas filling both compartments of said manifold, and the inner tube of said solar collector, and

means for propelling said gas in said manifold from one compartment thereof through the solar collector from its other end to its one end and return and into the other compartment of the manifold.

4,016,861

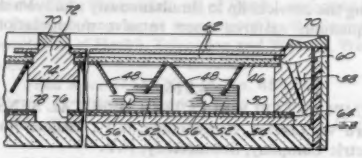
SOLAR HEATING SYSTEM

Max F. Taylor, Rte. 1, Whitewater, Wis. 53190

Filed July 2, 1975, Ser. No. 592,499

Int. Cl.² F24J *3/02*

U.S. Cl. 126—270 **9 Claims**



1. A solar heat collector comprising a unitary top plate having a plurality of spaced apart downwardly extending tabs formed from the material of said top plate, there being a plurality of openings in said top plate each located between a corresponding pair of said tabs, a unitary bottom plate having a plurality of spaced apart upwardly extending tabs formed from the material of said bottom plate, there being a plurality of openings in said bottom plate each located between a corresponding pair of said tabs, frame means supporting said top and bottom plates in spaced apart relationship with the tabs intermeshed to form a plurality of heating chambers each bounded by a pair of said downwardly extending tabs and a pair of said upwardly extending tabs, first and second means covering the openings in said top and bottom plates and an air inlet and outlet in said frame to permit a stream of air to be moved through said heating chambers and wherein said first means is transparent.

4,016,862

ECHOSCOPE FOR EXAMINATION OF OBJECTS

Charles T. Lancee, Westeinde 17, Waarder, and Gerardus van Zwieten, Klompenmakerij 42, Smitshoek, both of Netherlands

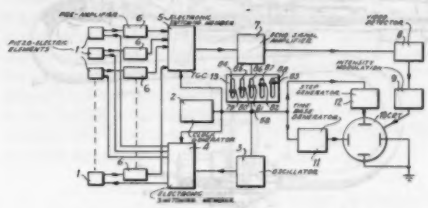
Continuation-in-part of Ser. No. 428,769, Dec. 27, 1973, abandoned. This application June 16, 1975, Ser. No. 587,385

Claims priority, application Netherlands, Dec. 28, 1972, 7217703

Int. Cl.² A61B *10/00*

U.S. Cl. 128—2 V **20 Claims**

1. In an echoscope for examination of objects with the aid of an ultrasound beam, comprising at least one electro-acoustic element for transmitting and receiving ultrasonic pulses during a transmission-reception period; an amplifier with time-dependent gain control cooperating with the electro-acoustic element for amplifying the echo signals supplied by said element; a control voltage generator connected to said amplifier for supplying a control voltage thereto to determine the signal gain as a function of time; adjusting means in said control voltage generator for permitting changing the magnitude of the control voltage as a function of time in n consecutive time intervals of the transmission-reception period, which are bounded by the interval points of time $t_1, t_2, \ldots t_i, t_j, t_k, \ldots t_{n-1}, t_n$; and a display connected to the echo signal amplifier for the visual display of the echo signals received during each transmission-reception period, the improvement of the control voltage generator comprising a) at least two adjustable voltage sources, each of which cooperates with the adjusting means for arbitrarily setting the voltages (e_i, e_j) of said sources prevailing at the corresponding interval points of time (t_i and t_j respectively) between a minimum and a maximum value; b) a differential amplifier for each of the time intervals connected to the adjustable voltage sources corresponding to the



interval points of time bounding said time interval; c) integrator means for supplying the control voltage to the echo signal amplifier, said integrator means cooperating with the differential amplifiers to integrate the output voltages ($e_j - e_i$) of said differential amplifiers during the respective time interval (t_i to t_j) with an integrator time constant $(RC)_i$; and d) switching means cooperating with said integrator means for successively integrating the difference voltages ($e_j - e_i$) during consecutive time intervals ($t_j - t_i$), said time intervals ($t_j - t_i$) corresponding to the respective integrator time constants $(RC)_i$ according to the relation

$$\frac{t_1 - t_0}{(RC)_1} = \ldots = \frac{t_2 - t_1}{(RC)_2} = \frac{t_1}{(RC)_1},$$

with $i=0,1,2,\ldots,n-1$, and $j=i+1$. --

4,016,863

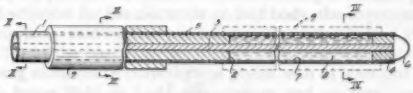
TISSUE TONOMETER DEVICE FOR USE IN MEASURING GAS IN BODY TISSUE

John W. Brantigan, 7723 Forest Drive, NE., Seattle, Wash. 98115

Filed Aug. 27, 1975, Ser. No. 608,157

Int. Cl.² A61B *5/00*

U.S. Cl. 128—2 G **10 Claims**



1. A catheter device incorporating the diffusion membrane principle to obtain samples of gases from the tissue of a patient for use with analyzing apparatus wherein the improvement comprises:

a catheter device having a plugged lumen forming a solid proximal portion,

a distal portion having a sealed chamber therein,

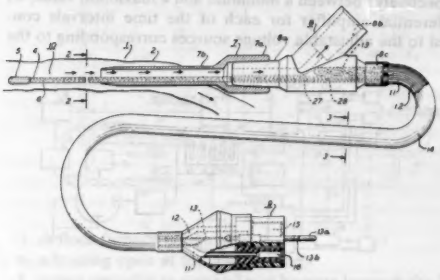
a diffusion membrane permeable to gases but impermeable to liquids forming the outer wall of said chamber, and

said chamber being filled with a chemically inert tonometering liquid for equilibration with body tissue gases and of sufficient volume for analysis by blood gas analyzing equipment available in most hospitals.

4,016,864
BLOOD GAS CATHETER

Ulrich Sielaff, and Wilfried R. Peickert, both of Madison, Wis., assignors to Airco, Inc., Montvale, N.J.

Continuation-in-part of Ser. No. 493,939, Aug. 1, 1974, abandoned. This application Sept. 8, 1975, Ser. No. 611,473
Int. Cl. A61B 5/00
U.S. Cl. 128—2 G 18 Claims



1. A device for sampling gases dissolved in the blood of a living subject, comprising in combination:

a catheter having distal and proximal ends,

means disposed at the distal end of said catheter comprising a tubular gas permeable membrane primarily of material highly permeable to gas but substantially impermeable to blood, constructed for insertion through a cannula percutaneously into the blood vessel in a direction extending along the principal axis thereof, said tubular membrane including a continuous gas permeable conduit, at least a portion of the lateral walls of said conduit being constructed and arranged during percutaneous deposition of said tubular membrane to make contact with the blood of said subject,

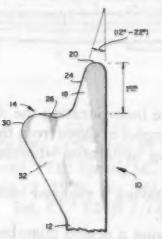
means comprising a housing at the proximal end of said catheter including input and output gas receptacles respectively constructed and arranged for connection in circuit relation to a source of carrier gas at said input receptacle and to gas receiving means at said output receptacle,

said conduit having input and output terminals respectively connected through separate connecting means to said input and output gas receptacles.

4,016,865
CERVICAL-VAGINAL SPATULA

Richard N. Fredricks, 201 E. 28th St., New York, N.Y. 10016

Filed Sept. 17, 1975, Ser. No. 614,314
Int. Cl.² A61B 10/00, 17/22
U.S. Cl. 128—002 B 7 Claims

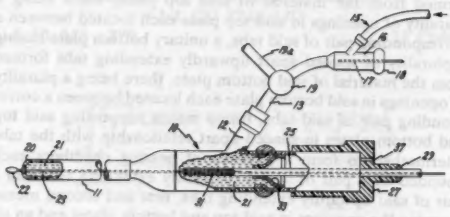


1. A cervical sampling scraper comprising a planar body including a stem and means for scraping the wall of the cervical canal in the region of the transition zone to obtain a sampling of cells of endocervical origin, said scraping means including a wedge shaped protuberance, the protuberance projecting from one end of the stem, the protuberance including a rounded distal tip, the tip having a diameter approximating the diameter of a normal cervical canal at the cervical portio, the protuberance further including a first straight lateral scraping edge being coincident with an edge of the stem, a second scraping edge extending from the tip at a diverging angle of at least 12° from the first scraping edge and terminating at a base portion of the protuberance, the scraping edges being spaced from one another at the base of the protuberance a distance approximating twice the diameter of the normal cervical canal at the cervical portio and the protuberance extending from the tip to the base a distance of at least one centimeter, limiting means for controlling depth of penetration of the protuberance into the cervical canal, said limiting means including a supportive web projecting laterally from the step adjacent the protuberance, said web having a squamous sampling edge extending substantially transverse to the axis of the stem, said sampling edge having a concave portion being coterminous with the second diverging scraping edge, whereby the protuberance may be fully inserted into and effectively distend a cervical canal with the exertion of a minimal wedge pressure to scrape a deposit of endocervical cell material from the cervical wall with the sampling edge cradling the cervical lip to simultaneously remove a deposit of the squamous material upon rotative manipulation of the stem.

4,016,866
IMPLANTABLE ELECTROCHEMICAL SENSOR

Richard W. Lawton, Schenectady, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Dec. 18, 1975, Ser. No. 641,833
Int. Cl.² A61B 5/00
U.S. Cl. 128—2 E 4 Claims



1. A specific ion sensor for in vivo use which can be calibrated in situ without withdrawing blood from a patient which comprises

a. an elongated insulated sensing electrode having an electrochemically active portion at one end exposed for contact with blood in a patient's blood vessel and having its other end exposed for connection to recording equipment,

b. a guard tube receiving and enclosing a portion of the length of the sensing electrode removed from the electrochemically active portion thereof,

c. a catheter receiving and enclosing a portion of the length of the tube and the sensing electrode and having an open leading end and additionally having a side port and having a trailing end through which the said other end of the sensing electrode extends,

d. sensing electrode positioning means connected to the sensing electrode at a point removed from the electrochemically active portion for moving the electrode axially relative to the catheter to position the said active portion within the open end of the catheter for calibration purposes and to position said active portion outside the open end of the catheter for in vivo measurement purposes,

e. drip line means communicating with the catheter through the side port for delivering electrolyte into the catheter at pressure greater than that of a patient's blood at the open end of the catheter,

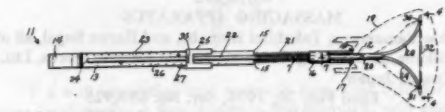
f. a reference electrode positioned partially in the drip line means for functional contact with electrolyte flowing to the catheter and having a portion disposed outside the drip line means for connection to recording equipment,
g. flexible sealing means secured to the catheter between the side port and the trailing end of the catheter and pressure sealing against an annular portion of the tube to prevent electrolyte flow and blood reflux in the direction of the trailing end of the catheter beyond a predetermined point, and
h. sealing means within the guard tube and in contact with an annular portion of the sensing electrode therein to prevent flow of electrolyte through the guard tube.

4,016,867

UTERINE CALIPER AND DEPTH GAUGE

Loyd L. King, Benton City; Robert G. Wheeler, Richland, and Thomas M. Fish, Kennewick, all of Wash., assignors to The United States of America as represented by the Secretary of the Department of Health, Education and Welfare, Washington, D.C.

Filed Apr. 27, 1976, Ser. No. 680,705
Int. Cl.² A61B *5/10*
U.S. Cl. 128—2 S **10 Claims**



1. A uterine caliper and sound comprising an elongated body having a longitudinally split distal end and means to measure uterine width at the fundus comprising a pair of opposed outwardly resiliently biased caliper wings at said distal end, said wings constituting said split distal end, and said elongated body having a longitudinal scale portion, spring-loaded cervical stop means movably mounted on said body, depth indicator means rigidly connected to said cervical stop means and extending over said scale portion, width indicator means slidably mounted on said scale portion, and control means operatively interconnecting said width indicator means with said caliper wings to control the separation of said caliper wings in accordance with the position of said width indicator means on said scale portion and so that the wings can at times be closed for insertion into a uterus and can thereafter be released to internally engage the lateral walls of the uterus.

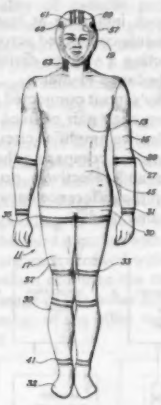
4,016,868

GARMENT FOR IMPEDANCE PLETHYSMOGRAPH USE

Robert D. Allison, Rte. 4, Box 4325, Belton, Tex. 76513

Filed Nov. 25, 1975, Ser. No. 635,259
Int. Cl.² A61B *5/04*
U.S. Cl. 128—2.1 E **12 Claims**

1. An apparatus for providing electrical contact with a body for impedance plethsmograph measurements comprising:
a garment of nonconductive elastic fabric for clothing tightly a portion of the body; and
a plurality of electrodes, insulated electrically from each other and located at selected intervals in pairs for the attachment of instruments to measure blood flow in the body; the electrodes being elastic fabric impregnated with conductive material and woven into the nonconductive



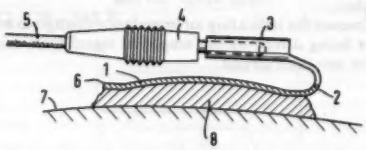
portions of the garment, providing a uniform interior and exterior surface of the garment.

4,016,869

SIGNAL COLLECTOR SYSTEM

Helmut Reichenberger, Brand, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Oct. 30, 1975, Ser. No. 627,465
Claims priority, application Germany, Nov. 18, 1974, 2454567
Int. Cl.² A61B *5/04*
U.S. Cl. 128—2.1 E **6 Claims**



1. In a signal collector system, particularly for electrical body signals and the like, including at least one electrode connectable to a signal cable; and an electrically conductive paste positioned on said electrode at an application location, said electrode comprising means for extensively eliminating effects of forces and torques acting on said electrode in the applying position thereof, said paste forming a contact paste and adhesive for the electrode on said body, the improvement comprising: said contact paste comprising polyethylene glycol (PEG) as the base material thereof, said base material comprising mixtures of polyethylene glycol with at least one portion being fluid at body temperature and another portion being relatively solid at body temperature, said one portion of said mixture having a molecular weight of about 400 and said another portion having a molecular weight of about 6000.

4,016,870

ELECTRONIC ACUPUNCTURE POINT FINDER

Chuck Lock, 144 - 6th Ave., San Francisco, Calif. 94118

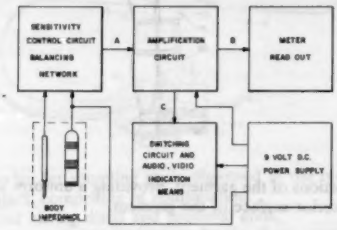
Filed Oct. 14, 1975, Ser. No. 622,050
Int. Cl.² A61B *5/05*; A61H *39/02*
U.S. Cl. 128—2.1 C **4 Claims**

1. In an electronic acupuncture point finder having a point finder probe, a grabber electrode, means, such as an audio or visual means, for indicating to an operator a change in body

impedance as the point finder probe is passed over the patient's skin, and a voltage supply means, the improvement comprising

a balancing network including at least two pairs of fixed impedance elements connected across said voltage supply means for effecting a voltage division between each of said pair of impedance elements,

a selective amplifier circuit connected across said balancing network between each pair of fixed impedance elements thereof, said selective amplifier circuit having at least two inputs and means for comparing the electrical signals to said two inputs and selectively producing an amplifier signal only when the difference between said inputs are of a preselected value, and



a sensitivity adjustment circuit electrically interconnecting said point finder probe and grabber electrode to one input of said selective amplifier circuit, said sensitivity adjustment circuit having circuit means for adjusting the voltage level to the input of said amplifier circuit to which said sensitivity adjustment circuit is connected for any given body impedance presented between said point finder probe and grabber electrode whereby said amplifier circuit is only turned on for producing an amplified signal when said body impedance is below a preselected value,

said means for indicating an impedance change to an operator being driven by the amplified signal from said selective amplifier circuit.

4,016,871

ELECTRONIC SYNCHRONIZER-MONITOR SYSTEM FOR CONTROLLING THE TIMING OF MECHANICAL ASSISTANCE AND PACING OF THE HEART

Peter Schiff, Box 117, Schwenksville, Pa. 19473

Filed Mar. 6, 1975, Ser. No. 556,153

Int. Cl.² A61B *5/04*

U.S. Cl. 128—2.06 R **12 Claims**

1. Means for accurately controlling the operation of an assistance device having first and second operating states utilized to assist and augment the beating of the heart of a patent under treatment comprising:

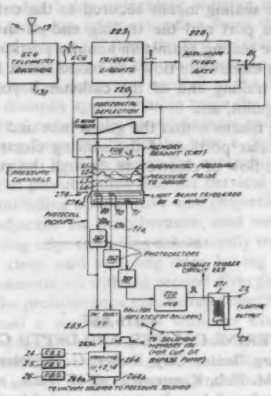
display means including a cathode ray tube and means for generating a timing bar which sweeps across one predetermined portion of the tube face along an imaginary straight line path at a rate related to the patient's present heart beat;

first and second photocells positioned remote from said tube face;

first and second optical pick-up means and means for slidably positioning said first and second pick-up means at any location along said path;

first and second fiber optic bundles each being respectively connected between one of said first and second pick-ups and one of said first and second photocells whereby each photocell is activated as the timing bar passes its associated pick-up;

circuit means controlled by activation of said first and second photocells for alternately shifting said assistance device to its first and second operating states wherein the



initiation of each operating state is dependent upon the relative positions of said pick-ups along said path.

4,016,872

MASSAGING APPARATUS

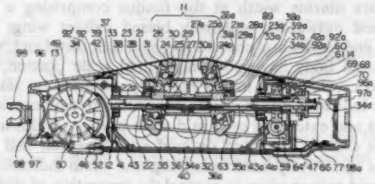
Yukio Yamamura; Takafumi Hamabe, and Haruo Sugai, all of Hikone, Japan, assignors to Matsushita Electric Works, Ltd., Osaka, Japan

Filed Feb. 20, 1976, Ser. No. 659,925

Claims priority, application Japan, Feb. 26, 1975, 50-24360

Int. Cl.² A61H *7/00*

U.S. Cl. 128—44 **15 Claims**



1. A massaging apparatus comprising a support means, a driving shaft pivoted to said support means, means for driving said driving shaft, massaging means mounted to said driving shaft eccentrically as inclined with respect to the axis of the driving shaft, and a massaging range adjusting means including another shaft rotated together with said driving shaft and moving said massaging means along the axis of the driving shaft.

4,016,873

PNEUMATIC IMPACTER

Otis F. Anderson, P.O. Box 723, Winfield, Kans. 67156

Filed Apr. 1, 1976, Ser. No. 672,596

Int. Cl.² A61H *23/00*

U.S. Cl. 128—54 **8 Claims**

1. A pneumatically actuated impacter for use in chiropractic therapy comprising:

a. a reservoir for containing compressed air, said reservoir having a fitting removably connectible to a source of compressed air and an adjustable pressure relief valve for regulating the pressure therein;

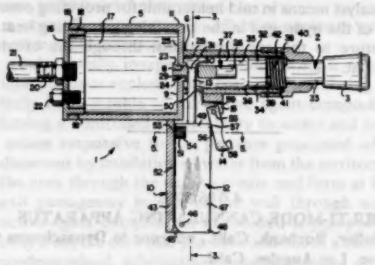
b. a hollow cylinder mounted on said reservoir, extending

therefrom, and terminating in a front end having an axial opening therethrough, said cylinder having a cylinder annular shoulder formed in said opening at said front end facing said reservoir;

c. a plunger reciprocably mounted in said cylinder, said plunger having a piston at one end, a shank portion extending through said axial opening, and an impact end remote from said piston end, said impact end having a resilient cap thereon, and said plunger having a plunger annular shoulder between said piston and said shank portion, said plunger shoulder facing said cylinder shoulder;

d. a recoil spring sleeved onto said shank portion with respective opposite ends engaging said cylinder and said plunger shoulders, said recoil spring urging said plunger toward said reservoir;

e. a channel shaped handle member having a central web extending laterally outwardly from said cylinder and reservoir, and having spaced apart, parallel flanges extending toward said cylinder front end;



f. a wall separating said reservoir from said cylinder, said wall having a flow aperture therethrough, said aperture having a valve seat formed on the reservoir side thereof;

g. a linearly translatable valve member having a head portion seatable on said valve seat and an elongated stem extending toward said front end, said stem being in close sliding contact with said flow aperture walls and having a flow passage formed thereon for communicating compressed air from said reservoir to said cylinder;

h. an elongated valve lever pivotally mounted on said handle and having one end engaging said valve stem to translate said valve from a seated position to an unseated position;

i. a trigger member pivotally mounted on said handle and having a surface engaging said valve lever to facilitate pivoting thereof; and

j. a return spring positioned between said valve lever and said handle to normally urge said valve lever to retain said valve head in a seated position.

4,016,874

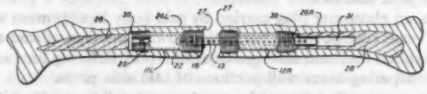
THREE-PART INTRAMEDULLARY BONE-SETTING PIN

Ernest J. Maffei, 1681 James St., Syracuse, N.Y. 13203, and David W. Patch, 101 Clareview Drive, Clay, N.Y. 13041

Filed May 19, 1976, Ser. No. 688,056

Int. Cl.² A61F 5/04; A61B 17/18

U.S. Cl. 128—92 BC **6 Claims**



1. A three-part bone-setting spline pin for aligning and mutually non-rotatably securing together two portions of a fractured elongated bone, comprising: two tubular outer members adapted to be inserted through an incision at the point of fracture into the intramedullary passage in respective bone portions on either side of the fracture, each outer member having a plurality of radially projecting self tapping threads adapted to be screwed into gripping relation with the cortex of the bone portion around the intramedullary passage of a respective bone portion, and a third central rodlike aligning member of a length substantially equal to the length between the threads at the distal end of the one outer member and the threads at the distal end of the other outer member when the outer members are brought into end-to-end juxtaposition, the third member having a multisided cross-sectional shape, each outer member having for at least a portion of its length a reduced axial passage therethrough of a cross-sectional shape corresponding to that of the third member for containing therein the third member with a sliding fit, whereby the outer members are each screwed within the bony cortex of respective bone portions and then the third member inserted in the multisided passage of one outer member and then reciprocated into the passage of the other member when the bone portions are aligned.

4,016,875

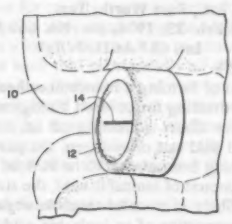
PENIS LOCKING AND LACERATING VAGINAL INSERT

Alston L. Levesque, Burlingame, Calif., assignor to Raymond Lee Organization, Inc., New York, N.Y.

Filed Apr. 8, 1976, Ser. No. 675,114

Int. Cl.² A61F 13/00

U.S. Cl. 128—132 R **2 Claims**



1. A penis locking and lacerating device, comprising:

a plurality of rigid members,

each of the rigid members forming a lateral enlargement of each side of the rigid member,

a plurality of housing members,

each of the housing members forming a slot at each side of the housing member within which one of the enlargements of the rigid members may be received,

means of sealing the housing member slot after insertion of the rigid member enlargement, whereby the rigid member is permanently locked within the housing member,

spring means of yieldably pressing the rigid members distal to the housing member,

a slot formed in an internal surface of the rigid housing,

a blade mounted within the slot in the internal surface of the rigid housing, and

means of pivoting the blade attached to the blade and mounted within the internal surface of the housing member.

4,016,876

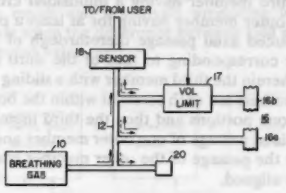
BREATHING APPARATUS

Frank E. Martin, Chester; John R. Colston, Annapolis, and Norman E. Smith, Pasadena, all of Md., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Division of Ser. No. 413,413, Nov. 6, 1973, Pat. No. 3,913,576. This application July 30, 1975, Ser. No. 600,751

Int. Cl.² A62B 7/02; A61M 16/00

U.S. Cl. 128—142 R **4 Claims**



1. Breathing apparatus comprising:
a. means for providing a user with a gas to be breathed;
b. a gas saver means for the capture of the initial portion of the user's exhaled breath;
c. carbon dioxide sensing means for sensing the carbon dioxide content of the user's exhaled breath and operable to provide an output signal indicative thereof;
d. means responsive to said output signal for preventing further capture of said exhaled breath during the time it is being exhaled, when the carbon dioxide content thereof attains a predetermined level;
e. means for discharging said exhaled breath to atmosphere after said predetermined level has been attained.

4,016,877

FIBROUS COLLAGEN DERIVED WEB HAVING HEMOSTATIC AND WOUND SEALING PROPERTIES

Mamerto M. Cruz, Jr., Pennington, N.J.; John H. Tenery, Fort Worth, Tex., and LaVerne C. Tressler, Trenton, N.J., assignors to Avicon, Inc., Fort Worth, Tex.

Filed Feb. 23, 1976, Ser. No. 660,065

Int. Cl.² A61L 51/00

U.S. Cl. 128—156 **9 Claims**

1. The method of forming a hemostat-adhesive, liquid-laid, non-woven web dressing for severed biological surfaces from hemostat-adhesive fibers consisting of an ionizable, water-insoluble, partial acid salt of collagen, the partial acid salt of collagen containing from about 50 to 90% of the theoretical stoichiometric amount of ionizable acid, the steps of preparing a slurry of the fibers in a water-miscible organic liquid containing a small proportion of an ionizable acid, the proportion of acid being sufficient to prevent leaching of acid from the partial salt of collagen, sheeting the fibers to form a web, removing excess liquid from the web, subjecting the web to a uniform pressure between 7 and 70,3 gm. per sq. cm. and thereafter freeze drying the web.

4,016,878

HEATER AND HUMIDIFIER FOR BREATHING APPARATUS

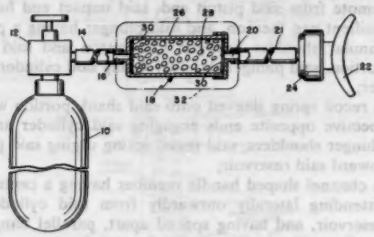
David Castel, San Diego, and Stephen E. Suess, La Jolla, both of Calif., assignors to Foundation for Ocean Research, San Diego, Calif.

Filed June 27, 1975, Ser. No. 590,820

Int. Cl.² A61M 16/00

U.S. Cl. 128—212 **18 Claims**

1. A heater and humidifier for adding heat and moisture in a controlled amount to a breathing gas, such as air, for use in a human breathing apparatus, comprising:
means for providing a supply of hydrogen and oxygen breathing gas with the hydrogen being less than three percent of the combined mixture,
a heater unit having inlet means for connection to said gas source means and an outlet for connection to a breathing utilization element,



valve means coupled to said heater unit for controlling the flow of hydrogen and breathing gas,
and catalyst means in said heater unit for providing combustion of the hydrogen in the breathing gas adding heat and moisture to the gas passing out through the breathing element.

4,016,879

MULTI-MODE CANNULATING APPARATUS

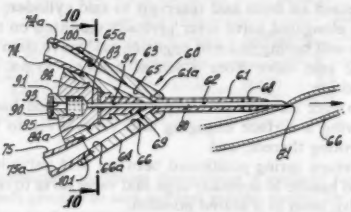
Eli K. Mellor, Burbank, Calif., assignor to Dynasciences Corporation, Los Angeles, Calif.

Continuation-in-part of Ser. No. 390,542, Aug. 22, 1973, Pat. No. 3,875,938. This application Apr. 7, 1975, Ser. No. 565,436

The portion of the term of this patent subsequent to Apr. 8, 1992, has been disclaimed.

Int. Cl.² A61M 5/00

U.S. Cl. 128—214.4 **2 Claims**

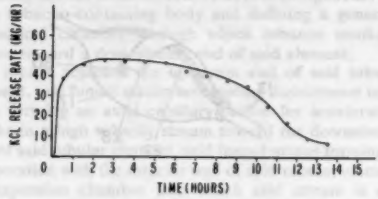


1. In cannulating apparatus, the combination comprising:
a. an axially extending tubular body defining a blood flow passage and having a forward stem portion insertible into a blood vessel, said body defining two side ports and including two stub ducts defining forwardly tapering bores communicating at their forward ends with said side ports for conducting blood flowing between said passage and auxiliary tubing connectible at rearward ends of said ducts, said body also defining a rear port in alignment with said axis,
b. an elastomer plug carried by said body in alignment with said rear port and projecting to the junction of said side ports and said flow passage, said plug defining forwardly tapering inner wall portions of said side ports,
c. rearwardly removable structure extending axially within said passage and axially through said plug, said structure having a vessel puncturing forward tip, and
d. said side ports intersecting said passage at a location relatively close to the forward end of said stem portion.

4,016,880
OSMOTICALLY DRIVEN ACTIVE AGENT DISPENSER

Felix Theeuwes, Los Altos, and Nalinkant C. Damani, Sunnyvale, both of Calif., assignors to Alza Corporation, Palo Alto, Calif.

Filed Mar. 4, 1976, Ser. No. 663,665
Int. Cl.² A61M 31/00
U.S. Cl. 128—260 11 Claims



1. An osmotically driven active agent dispenser for use in an aqueous environment comprising:

a. a core of an osmotically effective pressure generating active agent composition; and

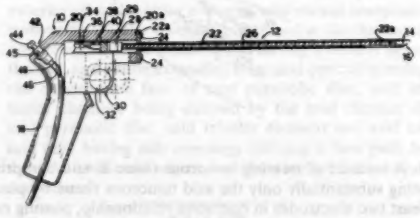
b. a substantially inexpandable wall having a substantially intact surface enclosing the core, said wall being substantially impermeable to the active agent composition and having a controlled permeability to water and including,

c. means responsive to the pressure generated within the dispenser by imbibition of water from the environment by the core through the wall to create and form at least one exit passageway in situ in the wall through which the active agent composition in solution is pumped osmotically from the core into the environment at a substantially predetermined, substantially constant rate.

4,016,881
INSTRUMENT FOR USE IN LAPAROSCOPIC TUBAL CAUTERIZATION

Jacques E. Rioux, Ste. Foy; Gerald Turp, and Francois Jacques, both of Neufchatel, all of Canada, assignors to Centre de Recherche Industrielle du Quebec, Ste. Foy, Canada

Continuation-in-part of Ser. No. 378,935, July 13, 1973, Pat. No. 3,938,527. This application May 27, 1975, Ser. No. 580,752
Claims priority, application Canada, July 4, 1973, 175625
Int. Cl.² A61B 17/36; A61N 3/04
U.S. Cl. 128—303.17 5 Claims



1. An instrument for use in laparoscopic tubal cauterization whereby a fallopian tube is completely blocked by coagulation, comprising:

a. an elongated narrow sheath having one open end;

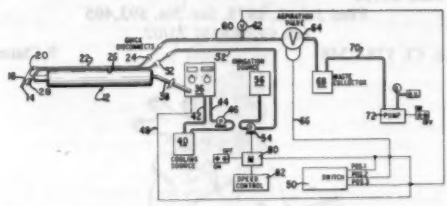
b. an electrically insulated separator means slidably mounted in said sheath, said separator means having diametrically opposite electrode-receiving grooves extending longitudinally thereof; said sheath and said separator means being made of plastic material; and

c. a pair of bipolar electrodes secured in said grooves, one end portion of each said electrode defining a prong extending outwardly from said open end of said sheath, said prongs being spaced from one another to define a first tube-receiving position whereby a tube may be grasped between said prongs, said prongs being movable to a second tube-squeezing position in response to said separator means being slidably retracted in said sheath whereby a grasped tube is squeezed by said prongs as said prongs contact said sheath end and are closed on said tube, each said prong including inwardly bent extremities defining fangs for grasping said tube, the planes of said fangs along the longitudinal axis of said separator means being offset one relative to the other to prevent said fangs from contacting one another when in said second tube-squeezing position, and each said prong including a heat shrinkable sleeve made of insulating material, the inner face of each prong including a non-insulating portion for allowing electrical discharge to said tube during cauterization; the opposite end of each said electrode including means for electrical connection to an external source of cauterizing current.

4,016,882
NEUROSONIC ASPIRATOR AND METHOD

Alan Broadwin, Brooklyn, N.Y.; Steven N. Weiss, Laguna Niguel, Calif., and Stanley H. Enker, Lawrence, N.Y., assignors to Cavitron Corporation, New York, N.Y.

Filed Mar. 5, 1975, Ser. No. 555,474
Int. Cl.² A61B 17/32
U.S. Cl. 128—305 5 Claims



1. A procedure for rapidly removing neurological tissue that has been exposed to view comprising the steps of: vibrating a tool tip that has a longitudinal axis at an ultrasonic frequency and in a manner such that substantially all of said vibration is transverse to the longitudinal axis of the tip;

sweeping the tip back and forth over the surface of and in contact with the exposed tissue, said sweeping motion of the tip occurring in a plane generally parallel to said transverse vibration to disintegrate the tissue layer by layer; and,

aspirating said disintegrated tissue simultaneously with said sweeping step.

4,016,883
MEDICAL CLAMP FOR OCCLUDING INTRACRANIAL BLOOD VESSELS

Sanford J. Wright, Jr., 2000 Baltimore Road, Rockville, Md. 20850

Filed Nov. 11, 1975, Ser. No. 624,302
Int. Cl.² A61B 17/12, 17/08
U.S. Cl. 128—325 31 Claims

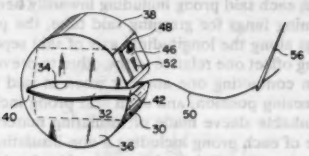
1. A medical clamp for controlled occlusion of a body vessel, comprising

a. vessel engaging means for applying pressure to generally opposed sides of a body vessel, said vessel engaging means including a pair of members having first and second vessel engaging surfaces, respectively;

b. connecting means for connecting said members to permit movement of said members between a first position in which said vessel engaging surfaces are spaced apart to receive a vessel and a second position in which said vessel

engaging surfaces are spaced sufficiently close to occlude a vessel placed therebetween;

c. pressure controlling means connected with said vessel engaging means for controlling the pressure applied to a vessel by controlling movement of said vessel engaging surfaces between said first and second positions and for holding said vessel engaging surfaces in any selected



position intermediate said first and second positions, said pressure controlling means including

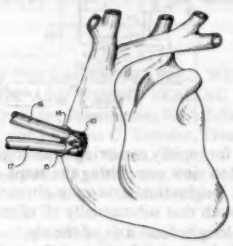
1. a flexible line having one portion thereof fixedly connected to said vessel engaging means, and
2. line securing means for selectively securing another portion of said flexible line to said vessel engaging means to hold said members in the selected intermediate position.

4,016,884

ATRIOTOMY ACCESS DEVICE

Clifford S. Kwan-Gett, 2208 E. 900 South, Salt Lake City, Utah 84108

Filed July 2, 1975, Ser. No. 592,405
Int. Cl.² A61M *25/02*
U.S. Cl. 128—348 **9 Claims**



1. An atriotomy access device comprising:

a. an adaptor body consisting of a resilient, compressible polymeric foam material which is tapered inwardly from front to back and which has extending through the width thereof from front to back at least one but not more than two incisions; and

b. a tab section attached to the adaptor body having an elastomeric band connected thereto which, when the adaptor body is inserted into the atrium, will wrap around the atrial tissue adjacent to the incision in the atrium and be anchored to said tab thereby sealing the adaptor body to the atrium incision walls in an air and fluid tight relationship.

6. A method of anchoring an atriotomy access device into the atrium of a heart which comprises:

a. making an incision into the right atrium of the heart,

b. inserting therein an adaptor body consisting of a substantially resilient, compressible polymeric foam material, said adaptor body being tapered inwardly from front to back and having one or more incisions extending through the width thereof from front to back; and

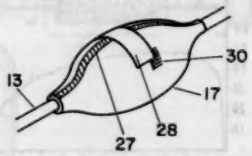
c. forming an air and fluid tight seal between the atrium incision and adaptor body by winding an elastomeric band attached to a tab section forming part of the adaptor body around the atrial tissues surrounding the incision and attaching said band to said tab section.

4,016,885

PRESSURE INDICATORS FOR INFLATABLE CUFF-TYPE CATHETERS

James D. Bruner, Englewood, Colo., assignor to Sandoz, Inc., E. Hanover, N.J.

Filed June 30, 1975, Ser. No. 591,601
Int. Cl.² A61M *16/00, 25/00*
U.S. Cl. 128—349 B **3 Claims**



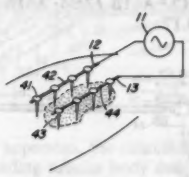
1. An inflatable cuff-type catheter for insertion into a body passage comprising in combination a flexible tube having distal and proximal ends, at least one gas inflatable cuff encircling the flexible tube near the distal end and having opposite ends sealed thereto; a branched tube connected at an inner end to the interior of the cuff; and an inflation means and a pressure indicator means connected in series to the cuff through the outer end of the branch tube for access outside the body passage, the indicator means comprising an expandable chamber having an open-ended spring wound about the mid-section of the chamber, which spring is adapted to expand with the chamber to indicate, by a predetermined setting on the surface thereof, the gas pressure within the inflatable cuff.

4,016,886

METHOD FOR LOCALIZING HEATING IN TUMOR TISSUE

James D. Doss, and Charles W. McCabe, both of Los Alamos, N. Mex., assignors to The United States of America as represented by The United States Energy Research and Development Administration, Washington, D.C.

Filed Nov. 26, 1974, Ser. No. 527,469
Int. Cl.² A61N *1/32*
U.S. Cl. 128—422 **2 Claims**



1. A method of treating tumorous tissue in situ comprising heating substantially only the said tumorous tissue by placing at least two electrodes in operative relationship, passing radio frequency current having a frequency less than 1 MHz substantially directly through the tumorous tissue, forming and placing electrodes to shape the field of said radio frequency current by inserting in the patient's body a plurality of electrically conductive pins on either side of tumorous tissue with the distance between opposite pins being inversely proportional to the required radio frequency field intensity and current; electrically interconnecting said pins on one side of said tumorous tissue; electrically interconnecting said pins on the other side of said tumorous tissue; and applying said radio frequency current to said interconnected pins on both sides of said tumorous tissue.

4,016,887

TWO-STAGE TOBACCO SMOKE FILTER

Miroslav Uroshevich, 2505 Fleetwood Ave., Cincinnati, Ohio 45211

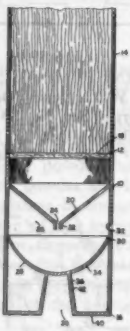
Filed June 21, 1973, Ser. No. 372,182
Int. Cl.² A24D 1/06
U.S. Cl. 131—261 R 5 Claims

1. Apparatus for filtering tobacco smoke, comprising:

a generally tubular element connectable at an upstream end to a tobacco-containing body and defining a generally cylindrical chamber through which tobacco smoke is drawn toward a downstream end of said element;

funnel means adjacent the upstream end of said tubular element, said funnel means terminating downstream in an apex forming an axial capillary orifice for accelerating smoke in a high velocity stream toward the downstream end of said tubular element, said funnel means forming in cooperation with the interior wall of said tubular element an expansion chamber into which said stream is discharged whereby said smoke is decelerated in said expansion chamber;

a parabolic disc for collecting particulate material, said parabolic disc being positioned downstream of said orifice, the axis of said parabolic disc being in the path of smoke discharged from said orifice, said parabolic disc having a periphery closely spaced from the interior walls of said tubular element, whereby said smoke is again



accelerated to flow at high velocity around said periphery, thereby inducing turbulence adjacent the downstream side of said parabolic disc and causing the deposition of particulate material thereon;

means downstream of said parabolic disc for defining an additional expansion chamber and a flow path to the exterior of said tubular element, said means comprising a transverse circular end disc positioned in the downstream end of said tubular element and having a central opening therein, and a tube extending from said central opening to the downstream face of said parabolic disc, said additional chamber being defined by the said circular disc, said parabolic disc, said tubular element and said tube, said tube having side openings defining a flow path from the said additional expansion chamber to the interior of said tube.

4,016,888

ADJUSTABLE WIGS

Alan Michael Smiley, North Miami, Fla., assignor to Revlon, Inc., New York, N.Y.

Filed Feb. 18, 1976, Ser. No. 659,133
Int. Cl.² A41G 3/00
U.S. Cl. 132—53 5 Claims

1. Means for reducing the size of a wig cap in combination with a stretch foundation fitting the head, said stretch foundation comprising a nylon mesh and a netting crown which stretches from side to side across the crown of the user's head, said means comprising three sets of closures, each set consisting of two fixed fasteners and one movable fastener, one fixed fastener being positioned near one edge of the netting crown, the movable fastener being attached to a strip which is attached at the opposite edge of the netting crown, and the

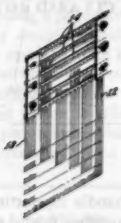
second fixed fastener being positioned substantially in the middle of the netting crown in substantial linear relationship to the first fixed fastener and the movable fastener, one of said sets of closures being positioned on one side of the foundation, the second at the other side, and the third in the middle.

4,016,889

HAIRPIECE

Mary M. Cowles, 529 Ross Drive, Escondido, Calif. 92025

Filed Feb. 21, 1975, Ser. No. 551,899
Int. Cl.² A41G 3/00
U.S. Cl. 132—56 2 Claims



1. A hairpiece for forming bangs on an existing hairdo or to supplement existing bangs of an existing hairdo comprising;

a relatively flat band of a length sufficient to support a number of strands of hair in a planar fashion of a sufficient amount to provide bangs to an existing hairdo, said band being yieldable and formable across the contour of the forehead,

hair means permanently bound by sewing and glueing and forming a bang of a sufficient width with a sufficient number of hair strands to selectively form a bang,

a plurality of such bands being substantially parallel with one another such that said strands are overlapping and with said bands being connected together by suitable vertical strips at least on each end of said bands with said strips being substantially perpendicular to said bands to provide a more fuller and pleasing look for the bang, and

means forming part of at least one of said bands to enable the hairpiece to be attached to the existing hairdo; and

said bangs so attached forming a full or partial bang for a more pleasing effect for the hairdo.

4,016,890

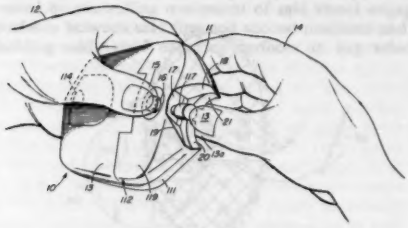
POWER-DRIVEN FINGERNAIL FILE

Joseph J. Fiorenza, Sr., Fort Lauderdale, Fla., and Irving Kalikow, Swampscott, Mass., assignors to Joseph J. Fiorenza, Oakland Park, Fla.

Filed Dec. 29, 1975, Ser. No. 644,614
Int. Cl.² A45D 29/04
U.S. Cl. 132—75.6 4 Claims

1. A portable, power-driven fingernail file which comprises a hollow body adapted to be held in one hand, a motor housed within the body and actuated by means of a switch on the

exterior of the body, an outer recess in the body formed in part by a pair of spaced-apart upwardly curved bottom walls



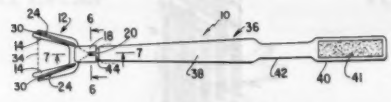
and an abrading member positioned between said curved bottom walls and rotated by said motor.

4,016,891

DENTAL FLOSS HOLDER FOR DETACHABLE SECUREMENT TO TOOTHBRUSH HANDLE AND THE LIKE FOR SUPPORTING A STRIP OF FLOSS IN TAUT CONDITION READY FOR USE

Sam Kupperman, Chicago, and Dennis I. Kupperman, Glenview, both of Ill., assignors to R B Toy Development Co., Skokie, Ill.

Filed July 17, 1975, Ser. No. 596,735
Int. Cl.² A45D *44/18*
U.S. Cl. 132—84 A **3 Claims**



1. In combination a handle supporting a toothbrush at one end and means for supporting a precut strip or length of dental floss in position ready for use at the opposite end, said means comprising a forked member having a pair of spaced diverging arms and a tubular extension at the inner end of said forked member forming a socket and in which the socket has a slot at the mouth thereof, said spaced arms extending rearwardly of said tubular extension and at an inclined plane with respect to said extension with each of said arms having a longitudinal groove on one of the surfaces and a transversely extending groove on the undersurface, a precut dental floss strip adapted to be strung on said forked member and to extend into the longitudinal and transverse grooves of said arms and extend between said arms with the opposite ends of said strip adjacent the tubular extension, said tubular extension adapted to be detachably secured to the end of said handle, with the opposite ends of said strip being held locked within said socket between said tubular extension and said handle end with at least one of the opposite ends of said strip passing through said slot and with the portion of the strip between the arms maintained in a tensioned and taut condition, said forked member inclined at an angle with respect to the longitudinal plane of the handle.

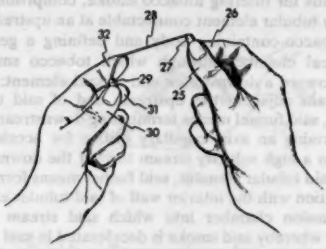
4,016,892

DENTAL FLOSS HOLDER

Ingram S. Chodorow, Stamford, Conn., assignor to Placontrol, Inc., Briarcliff Manor, N.Y.

Filed June 24, 1974, Ser. No. 482,131
Int. Cl.² A61C *15/00*
U.S. Cl. 132—91 **10 Claims**

1. A dental flossing apparatus formed as a plurality of consecutively spaced flossing units, the apparatus comprising a continuous strand of dental floss and a plurality of said flossing units secured to said strand, each of said flossing units comprising a pair of said gripping means, each of said flossing units spaced apart from adjacent units axially along said strand by a predetermined first distance, each two gripping means of each of said flossing units being spaced apart a second distance substantially greater than the first distance, each gripping



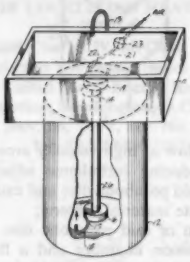
means being a three dimensional member having length, axially along the strand, and width and thickness dimensions transversely of length suitable to be held between a thumb and forefinger of a person's hand, wherein said thickness and width are generally constant along the length of said gripping members.

4,016,893

SOLVENT PUMPING SYSTEM

Donald C. Scott, 761 W. La Deney, Ontario, Calif. 91762

Continuation-in-part of Ser. No. 531,054, Dec. 9, 1974, abandoned. This application Oct. 22, 1975, Ser. No. 624,704
Int. Cl.² F04B *17/00*; B08B *3/00*
U.S. Cl. 134—115 R **19 Claims**



1. A solvent recirculation system comprising:
a solvent tank;
a sink mounted on top of the solvent tank including a drain for draining solvent from the sink back to the tank;
a centrifugal liquid pump mounted in the tank below the normal solvent level, and having an inlet spaced above the bottom of the tank, a cover with an opening therein for the inlet, and a tangential liquid outlet;
a centrifugal air turbine mounted in the tank above the normal solvent level, and having a tangential air inlet with the same rotational sense as the liquid outlet and an opening for the air outlet;
an air impeller in the air turbine;
a liquid impeller in the liquid pump;
a fixed tubular housing having a cross-sectional area that is smaller than the area covered by each impeller in a plane perpendicular to the axis of rotation and interconnecting the liquid pump and air turbine;
a drive shaft in the tubular housing interconnecting the air impeller and the liquid impeller;
means for mounting the drive shaft in the tubular housing for rotation; and

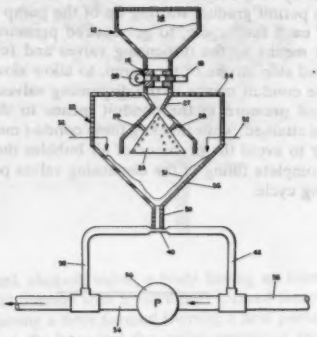
a liquid spout over the sink connected to the liquid outlet of the pump.

4,016,894

DRAG REDUCING COMPOSITION AND METHOD

Bruce B. Baldwin, East Grand Rapids, and Robert N. Hammer, East Lansing, both of Mich., assignors to Belknap Corporation, Grand Rapids, Mich.

Filed Aug. 28, 1975, Ser. No. 608,766
Int. Cl.² F17D *1/16*
U.S. Cl. 137—13 **11 Claims**



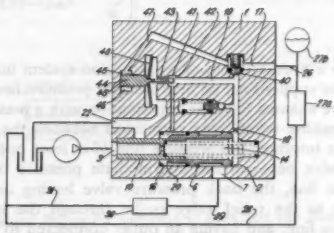
1. A process for reducing hydrodynamic drag of a turbulent aqueous stream comprising the step of injecting into the turbulent aqueous stream a mixture of a finely divided free flowing hygroscopic drag reducing powder, which tends to agglomerate when dissolved in water, and a colloidal size moisture repelling hydrophobic powder, the hydrophobic powder coating the hygroscopic powder and being of such size and being present in the mixture in amounts sufficient to effectively inhibit the caking of the hygroscopic powder under normal storage conditions, to promote free flow of the hygroscopic powder and to control the rate at which the hygroscopic powder dissolves in the aqueous water stream so as to minimize agglomeration of the hygroscopic powder during dissolution thereof.

4,016,895

FLOW CONTROL VALVE

Ludwig Budecker, Frankfurt, Germany, assignor to International Telephone and Telegraph Corporation, New York, N.Y.

Filed Aug. 29, 1975, Ser. No. 608,844
Claims priority, application Germany, Aug. 30, 1974, 2441662
Int. Cl.² G05D *15/00*
U.S. Cl. 137—101 **8 Claims**



1. A flow control valve for controlling the output of first and second delivery ports thereof in response to the output of a pump at the input thereof, said control valve comprising, in combination:

a valve body having an inlet port for receiving the output of said pump and said valve body having a discharge port thereon;

said valve body having a stepped bore therein extending from said inlet port and into said valve body and wherein the reduced diameter portion of said stepped bore is adjacent said inlet port;

a first piston slidably mounted in the other portion of said bore and translatable therein and said first piston having an axial bore therethrough;

a second piston slidably mounted in said reduced diameter portion of said stepped bore and extending into said axial bore of said first piston in telescopic relationship therewith, said second piston being translatable in said reduced portion of said stepped bore and said axial bore of said first piston, and said second piston having an axial bore extending therethrough which terminates in a restricted opening at the inner end thereof;

means for urging said pistons away from each other;

a first passageway coupling said first delivery port to a restricted opening in a wall portion of said stepped bore adjacent the inner end of said other portion of said stepped bore wherein said first delivery port communicates with said axial bore of said first piston;

a second passageway coupling said second delivery port to an opening at an intermediate portion of said other portion of said stepped bore wherein said second delivery port communicates with said axial bore of said first piston when said first piston is translated a given distance toward said second piston in response to the output pressure of said pump exceeding a predetermined value; and,

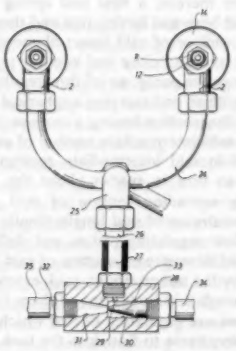
a third passageway coupling said discharge port of said valve body to an opening at an intermediate wall portion of said reduced portion of said stepped bore, wherein said discharge port communicates with said inlet opening when said second piston is translated a given distance toward said first piston in response to the output pressure of said pump exceeding a given maximum value.

4,016,896

DEVICE FOR THE DE-AIRING OF A LIQUID SYSTEM, PREFERABLY A SYSTEM FOR HYDRAULIC BRAKES

Eino Heikki Oikarinen, Torehatts Backe 9, S-417 28 Goteborg, Sweden

Filed Nov. 7, 1975, Ser. No. 630,049
Claims priority, application Sweden, Nov. 8, 1974, 7414038
Int. Cl.² F16K *45/02*
U.S. Cl. 137—205 **4 Claims**



1. A device for de-airing a liquid system having de-airing nipples designed as valves which when turned will open, said device comprising: a pumping device adapted to exclusively create a continuous vacuum; at least one duct connected to said pumping device and having one end to be connected to

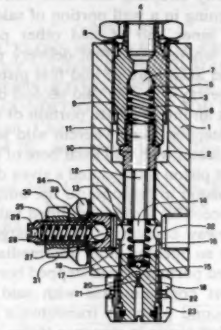
one of the de-airing nipples; a connecting piece mounted on said one end of said duct; turning means associated with said connecting piece for engagement with the respective de-airing nipple when the latter is connected to said duct to thereby open the valve; and vacuum-influenced tightening means for tightening the connection between said duct and the respective de-airing nipple.

4,016,897

PRESSURE AND FLOW-REGULATING VALVE FOR AUTOMATIC OR SEMIAUTOMATIC-CYCLE LUBRICATING SYSTEM

Zeo Asioli, Via Fosdondo, 54, Correggio, Italy

Filed Feb. 6, 1976, Ser. No. 656,073
Claims priority, application Italy, Feb. 10, 1975, 42506/75
Int. Cl.² G05D 7/01
U.S. Cl. 137—107 **4 Claims**



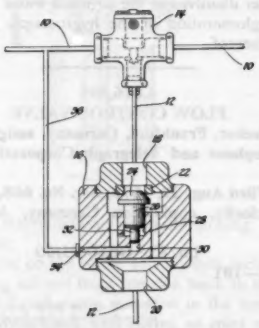
1. A pressure and flow regulating valve for use as part of an automatic or semiautomatic cycle lubricating system of motor vehicles, machine tools and machines in general by insertion in a path which conveys lubricating oil from a pump to oil dispensing valves in the lubricating system and which is adapted to communicate, directly via an extension conduit means, with oil contained in a feed tank for the pump, the valve comprising, in combination a valve body provided with an axial bore extending therethrough, having an inlet, an upstream section, an intermediate section, a downstream section and an outlet defining a drain; an insert element positioned in said upstream section of said bore and having an axial aperture therein; a first coil spring in said upstream section of said bore and having one end thereof positioned on an upstream surface of said insert element; a ball biased by said first coil spring to close and inlet for preventing return of oil coming from the pump; an oil flow regulating piston having a piston rod with an end carrying a spherical cap and a longitudinally extending section having a cross-section, whose area is smaller than said intermediate section of said axial bore slidably inserted in said intermediate section of said bore for allowing oil to flow in spaces about the periphery of said longitudinally extending section of said piston; a feeding chamber downstream of said longitudinally extending section of said oil flow regulating piston and defined by at least a portion of said downstream section of said bore for receiving oil flowing in the space about said extending section; two openings through said body, one of them for attachment of a maximum pressure regulating device which is to allow excess feed oil in every cycle to flow into the tank, the other one for attachment of conduit means which is to convey oil from the feeding chamber into the dispensing valves; a second coil spring positioned in said feeding chamber around said piston rod with one of its ends positioned against an annular downstream surface of said piston for biasing said piston towards an annular downstream surface of said insert element so as to obstruct oil flow, said second coil spring extending downstream and having a diameter smaller than that of said longitudinally extending section of said piston, an axially adjustable plug positioned in said downstream section of said bore, said second coil spring having its second end resting against a truncated-conical narrowing downstream passage of a cylindrical chamber and formed in an upstream face of said axially adjustable plug so as to create a closure seat for an axial bore which extends through said plug, and seat being positioned to receive said spherical cap on said end of said piston rod so as to permit oil to discharge into the tank via said axial bore in said plug; whereby the axial bore in said plug is of reduced diameter by virtue of the truncated-conical narrowing passage so as to permit gradual starting up of the pump at the beginning of each feed cycle, to get desired pressure in the feed conduit means to the dispensing valves and further, during each feed stop stroke of the pump, to allow slow drain of oil from the conduit means to the dispensing valves until a zeroing of oil pressure in the conduit means to the dispensing valves is attained, while keeping these conduit means full of oil in order to avoid the presence of air bubbles therein so as to make complete filling of the dispensing valves possible in the following cycle.

4,016,898

MEANS FOR SUPPRESSING CAVITATION IN A HIGH PRESSURE RELIEF VALVE

E. Stephen Tokarchuk, Warren, and Gaylord O. Ellis, Rochester, both of Mich., assignors to Sperry Rand Corporation, Troy, Mich.

Filed May 27, 1975, Ser. No. 581,016
Int. Cl.² G05D 11/00
U.S. Cl. 137—115 **2 Claims**

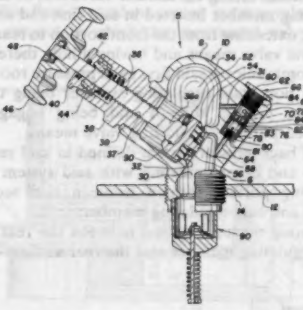


1. In a hydraulic power transmission system having a high pressure supply line, an intermediate pressure line and a low pressure exhaust line, the combination with a maximum pressure limiting relief valve connected between the supply line and the intermediate pressure line of at least one back pressure valve between the intermediate pressure line and the exhaust line, the back pressure valve having an inlet connected to the relief valve outlet through the intermediate pressure line, and having an outlet connected to the exhaust line, with the intermediate pressure acting over a first operating area to open the back pressure valve, and means comprising a piston of smaller operating area exposed to supply line pressure and acting to partially oppose the opening force of the intermediate pressure to thereby supress cavitation in the fluid leaving the relief valve.

4,016,899
RELIEF VALVE

Willard J. Fletcher, Dallas, Tex., assignor to Fitting, Valve & Control Corporation, Dallas, Tex.

Filed Dec. 10, 1975, Ser. No. 639,285
Int. Cl.² F16K 11/10
U.S. Cl. 137—115 6 Claims

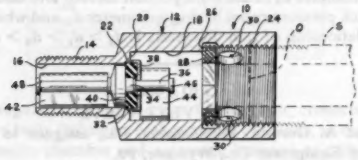


1. In a tank shut-off valve; a body having an inlet passage and an outlet passage with a valve port formed therebetween, said body having a bore formed therein; a first passage in the body between the bore and the outlet passage; a second passage in the body between the bore and the inlet passage; a valve seat in said port; a valve member arranged to seat on said valve seat and moveable from a position opening said valve port to a position closing said valve port; a relief valve assembly detachably secured in said bore having a portion with a second port formed therethrough communicating with the first passage and the second passage; a resilient valve member arranged to be urged against said second port to close same; resilient means urging said valve member against said second port until a predetermined pressure from said outlet passage is exerted through said first passage and through said second port formed in said relief valve assembly against said valve member to overcome the resilient means to urge said valve member away from said second port to release the pressure within said outlet passage, allowing said pressure to pass through said second passage into said inlet passage.

4,016,900
SPRINGLESS VALVE FOR PNEUMATIC TIRES AND THE LIKE

John William Shipp, Centerville, and Paul Douglas Goodman, Dickson, both of Tenn., assignors to Scovill Manufacturing Company, Waterbury, Conn.

Filed Apr. 21, 1975, Ser. No. 569,777
Int. Cl.² F16K 15/20
U.S. Cl. 137—223 10 Claims



1. A valved fitting for pneumatic tires and the like comprising:

a. a tubular housing having a reduced section, the inside of the housing having a smooth cylindrical surface of one diameter in the area of the reduced section, and a smooth cylindrical surface of a second larger diameter to one side of the reduced section, the inside presenting a seating shoulder intermediate the surfaces and coupling means on the opposite side of the second surface from the first surface;

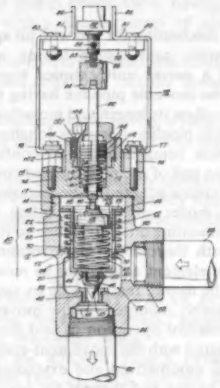
b. a valve comprising a pin disposed on the axis of the housing, the pin mounting intermediate its ends an annular sealing washer adapted to seat on the seating shoulder, and support means supporting the valve in the tubular housing, the support means comprising a pair of clips engaging the pin on either side of the washer respectively and engaging the first and second surfaces respectively, the clips each being of sheet material disposed longitudinally of the housing and having portions engaging the pin from opposite sides and also longitudinally engaging the associated surface of the housing at a plurality of points, the clips being held from longitudinal movement with respect to the pin,

whereby the valve including clip means is movable bodily in the housing as the clips slide along their associated surfaces.

4,016,901
THERMOSTATIC VALVE

Thomas M. Kenny, Paoli, Pa., assignor to Ogontz Controls Company, Willow Grove, Pa.

Filed June 23, 1975, Ser. No. 589,089
Int. Cl.² F16K 49/00
U.S. Cl. 137—340 8 Claims



6. A system for automatically preventing the freezing of a process pipe, said system comprising a steam source, a tracer line adjacent said process pipe connected at one end of said steam source, an insulating layer surrounding said tracer line and pipe, and a steam trap with ambient sensing on-off control at the end of said tracer line remote from said steam source, said steam trap with ambient sensing on-off control comprising an internal thermostatic actuator for opening and closing said trap responsive to fluid temperature conditions within said trap, and an external ambient air temperature responsive actuator for closing said trap when the ambient air temperature exceeds a predetermined temperature level.

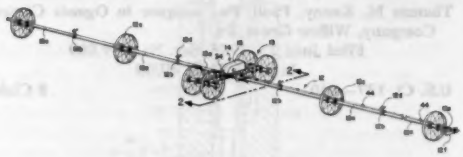
8. A steam trip with ambient sensing on/off control comprising a body, a closed chamber within said body, an inlet port in said body for connecting said chamber with a source of steam, an outlet port in said body for draining condensate from said chamber, a valve seat communicating with said outlet port, a valve closing element adapted for movement toward and away from said valve seat, a thermostatic actuator within said chamber connected with said valve closing element to provide movement thereof toward said valve seat upon an increase in temperature of the fluid within said chamber, said actuator comprising an expansible medium changing from the solid to

the liquid state upon increase in temperature of the fluid within said chamber, spring means biasing said valve closing element away from said valve seat, means for accommodating the over-expansion of said actuator upon engagement of said valve closing element with said valve seat, an ambient air response actuator disposed exteriorly of said body, and means connecting said ambient air responsive actuator with said thermostatic actuator within said chamber to cause a displacement of said latter actuator and said valve closing element in response to changes in ambient air temperature, said ambient air responsive actuator being adapted to engage said valve closing element with said valve seat upon the occurrence of a predetermined atmospheric air temperature.

4,016,902
END-CONTROL AGRICULTURAL SPRINKLER IRRIGATION SYSTEM

George Vollmer, Rte. No. 1, Americans Falls, Idaho 83211

Filed Nov. 11, 1975, Ser. No. 630,911
Int. Cl.² B05B *15/10*
U.S. Cl. 137—344 20 Claims



1. Control mechanism for use with an agricultural sprinkler, irrigation system, said system having wheel-mounted pipe sections and a mover unit coupled together end-to-end to form a sidewise movable pipeline having the mover unit interposed intermediate its length and including power drive means for rotating the pipeline about its longitudinal axis, said control mechanism being adapted to control the power drive means from an end of the pipeline and comprising movement-transmitting means adapted to be disposed between the pipeline and the mover unit and including a rotatable element adapted for mounting on the pipeline so it can be reciprocated back and forth therealong while rotating therewith, and a non-rotatable element adapted to be mounted on said mover unit so as to be moved rectilinearly by said rotatable element; a switch assembly mounted on the mover unit in association with and to control operation of said drive means; operating means associated with the movement-transmitting means; and a control line mounted on and extending along the pipeline substantially to one end thereof for operating said operating means to effect actuation of said switch assembly.

4,016,903
PILOT OPERATED PRESSURE AND VACUUM RELIEF VALVE

Mitsumasa Akashi, Kamakura, and Toshio Makio, Wako, both of Japan, assignors to Kabushiki Kaisha Komatsu Seisakusho, Tokyo, Japan

Filed Dec. 1, 1975, Ser. No. 636,595
Claims priority, application Japan, Nov. 29, 1974, 49-143399[U]
Int. Cl.² F16K *17/26*
U.S. Cl. 137—493.5 2 Claims

1. A pilot operated pressure and vacuum relief valve comprising

a housing having a bore in it;

a first vacuum responsive valve means slidably inserted in the bore of said housing;

a system port having a diameter d_1 provided at the front end portion of said housing, said system port being connectable with a portion of a hydraulic system in which varying fluid pressures may be developed;

a drain port opening from the front end portion of said housing and communicating with said system port through an annular rearwardly facing valve seat provided at the front portion of said housing;

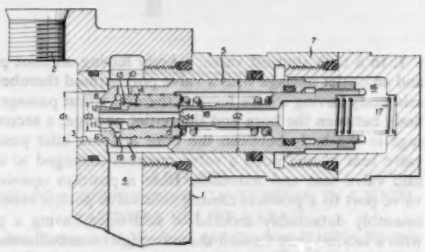
a first back pressure room having a diameter d_2 defined in said housing between a rear surface portion of said first valve means and a rear surface of the bore of said housing;

a second pressure responsive valve means slidably inserted in said first valve means, a front end portion of said second valve means facing the annular valve seat of said housing;

a regulating member inserted in said first and second valve means, extending from the front portion to rear portion of said first valve means and having a hole therethrough so as to communicate said first back pressure room with said system port, said regulating member being threaded at the rear portion thereof and being engaged with a threaded portion of said first valve means;

a second back pressure room defined in said second valve means and communicating with said system port via a throttling portion formed between said second valve means and said regulating member;

a first spring means disposed between the rear portion of said regulating member and the rear surface of the bore



of said housing, said first spring means exerting a spring force against the rear portion of said regulating member so as to bias said first valve means against the annular valve seat of said housing;

a second spring means disposed in said first valve means between said second valve means and said regulating member to bias said second valve means against an annular valve seat located on said first valve means;

means for communicating said system port with said drain port through a path between the annular valve seat of said first valve means and the front portion of said second valve means when the pressure in said system port exceeds a predetermined level;

means for communicating said system port with said drain port through a path between the annular valve face of said housing and the front end portion of said first valve means when a vacuum pressure is developed in said system port; and

said first valve means has an inlet port located therein opening to said annular valve seat of said first valve means with a diameter d_3 at the front portion thereof and said second back pressure room having a diameter d_4, and wherein the relationship of said diameters is $d_2 > d_1 > d_3 > d_4$.

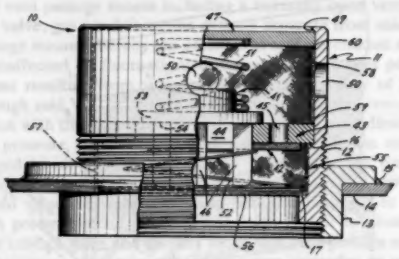
4,016,904
SAFETY VENT VALVE

Edmund A. Gordon, Philadelphia, Pa., assignor to Central Safety Equipment Co., Wyncote, Pa.

Filed Dec. 29, 1975, Ser. No. 644,659
Int. Cl.² F16K *17/26*
U.S. Cl. 137—493.9 5 Claims

1. In a safety valve of the kind including a pair of spring-loaded valve bodies, one displaceable to pressure-vent an associated container, to prevent explosion thereof, and the other displaceable to provide relief of vacuum within the container, to permit withdrawal of fluid therefrom, the im-

provements which comprise: a valve shell structure which consists of a tube capped toward one end thereof and apertured in the region of that end, said tube having in the region of an opposite end, a threaded portion for association with a container; a pair of shelf-like abutments spaced along the axis of the tube, extending inwardly of the tube, and peripherally of interior wall portions thereof; and a plurality of interior valve components all nested within said tube and supported by said abutment surfaces, said components including a pair of valve bodies, flame-retardant screen means, valve seat structure with respect to which the mentioned valve bodies are



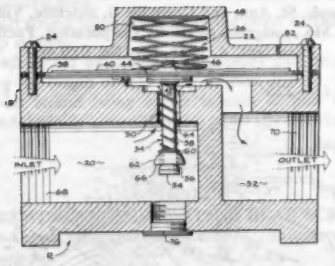
displaceable, and a pair of springs each of which urges an associated one of said valve bodies toward said seat structure, the improvements being further characterized in that said seat structure bears against one of said abutments; and said screen means includes two screens, one of which is seated upon the surface defined by the other of said abutments and extends across the open end of said tube, and the other of which screens extends across the apertured portion of said tube and has spaced, generally annular, portions one of which rests against the tube cap and the other of which bears against a surface portion of said seat structure, to maintain said other screen in position.

4,016,905

REGULATOR FOR LIQUEFIED PETROLEUM GAS SYSTEMS

John W. Marlatt, Sr., 2511 Abonado Place, Rowland Heights, Calif. 91748

Filed Feb. 6, 1976, Ser. No. 656,044
Int. Cl.² F16K *31/12*
U.S. Cl. 137—505.41 **4 Claims**



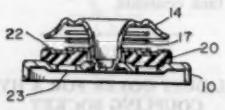
1. A regulator, as for use in a fluid system, comprising:
a valve body defining a high pressure chamber, a vented low pressure chamber and a passage between said chambers with a contiguous first valve seat;
a spring-biased diaphragm means affixed to said valve body for closing said vented low pressure chamber;
a valve stem means affixed to said diaphragm means and extending through said passage so as to be variously positioned therein under control of said diaphragm, said valve stem means including a stud affixed to extend coaxially from said diaphragm means,
valve member means slidably disposed on said valve stem for cooperation with said first valve seat to regulate the flow of gas through said passage from said high pressure chamber to said low pressure chamber,
said valve member means defining a second valve seat for cooperation with said valve stem means whereby a pair of concentric valves are provided in said regulator on said valve stem means, and
a coil spring mounted on said stud between said valve member means and said diaphragm to spring bias said valve member.

4,016,906

ANTI-LEAK FUEL PUMPS FOR VEHICLES

Ralph E. Ulm, Fairfield, Ill., assignor to Airtex Products, Div. of United Industrial Syndicate, Inc., New York, N.Y.

Filed Mar. 9, 1976, Ser. No. 665,249
Int. Cl.² F16K *15/08*
U.S. Cl. 137—516.21 **7 Claims**



1. A unitary fuel pump check valve having a valve seat member provided with a circular array of apertures therethrough;
a flexible valve disc overlaying said apertures to close flow therethrough and extending radially inwardly and outwardly thereof;
a spring pressed backup water having a ridge;
said ridge pressing into said flexible disc to deform it toward said apertures;
said backup washer effecting radially spaced circular areas of compression of said disc on radially opposite sides of said apertures against said valve seat member.

4,016,907

TANK BOTTOM INTERNAL VALVE HOUSING

William W. Rawstron, Northboro, Mass., assignor to Jamesbury Corporation, Worcester, Mass.

Continuation of Ser. No. 476,074, June 3, 1974, abandoned.
This application Oct. 31, 1975, Ser. No. 627,692
Int. Cl.² F16L *55/99*; F16K *1/22*
U.S. Cl. 137—797 **3 Claims**

1. A tank bottom butterfly valve assembly adapted to be attached to a saddle which is integrally formed with said tank and which has a lower face horizontally disposed to define a first plane, comprising a flanged butterfly valve housing having an upper surface which is substantially planar and has a circular grooved recess adapted to mate with a corresponding protrusion in said saddle when said butterfly valve housing is attached to said saddle such that said upper surface is disposed parallel to said first plane, a lower surface which is substantially planar and which is parallel to said upper surface thereby defining a second plane which is parallel to and below said

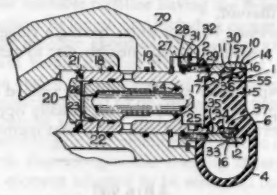
first plane, a butterfly valve disc and cooperating seat ring which are both completely disposed within the space bounded by said first and second plane when said butterfly disc is in the closed position, a discharge nozzle having an upper surface which is substantially planar and which is mounted to said valve housing such that said nozzle upper surface is disposed substantially parallel to said second plane, first connection means comprising a plurality of bolt holes disposed about the perimeter of said valve housing and adapted to receive a first set of bolts in said bolt holes which attach said valve housing to said saddle with a connection having a first shear strength, second connection means comprising a plurality of bolt holes through said nozzle upper surface and corresponding bolt holes in said valve housing lower surface and adapted to receive a second set of bolts which attach said nozzle to said valve housing with a connection having a second shear strength, said first shear strength being greater than said second shear strength such that unexpected forces on said tank bottom valve assembly will cause said nozzle to separate from said valve housing along the plane between them rather than said valve housing separating from said tank, and thus prevent discharge of the tank contents.

4,016,908

UNIVERSAL DUST COVER FOR A HYDRAULIC COUPLING SOCKET

Edward B. Heckenkamp, Brookfield, Wis., assignor to Allis-Chalmers Corporation, Milwaukee, Wis.

Filed Aug. 4, 1975, Ser. No. 601,845
Int. Cl.² B65D *59/06*; **F16L** *57/00*
U.S. Cl. 138—96 R **9 Claims**



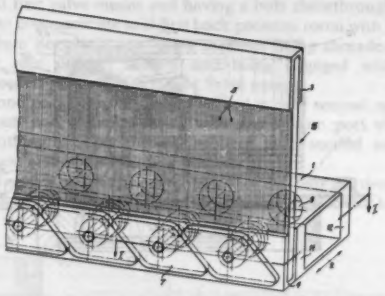
1. A resilient dust cover in combination with a socket section of a hydraulic coupling comprising, a hydraulic coupling including a socket section defining a socket said socket section including detent means on the inner periphery thereof, an expandable fastening loop extending peripherally around the socket section of the hydraulic coupling, a deformable plug portion, a flexible strap integrally connecting said fastening loop and said plug portion for carrying said plug portion of the dust cover when said dust cover is not in use, said plug portion including, a plug end said deformable plug portion received within the socket of the socket section of said hydraulic coupling and deforming when received in or removed from the socket, said plug portion defining a peripheral retaining groove adjacent said plug end for receiving said detent means on the inner periphery of the socket section of said hydraulic coupling for retaining the plug portion in the socket of said coupling, a disc portion integral with said plug portion extending radially from said plug portion and including a sealing flange extending axially from the peripheral of said disc portion resiliently biased radially and axially for sealing the periphery of said socket section of said hydraulic coupling, a raised portion on said disc portion joining said strap with said disc portion to allow said disc portion and said flange to be positioned either axially external of the socket of the socket section of the hydraulic coupling or to be received within the internal periphery of the socket, said axial sealing flange forming an annular recess intermediate said plug portion and said flange, said recess providing greater resilience to said flange to permit sealing engagement of said flange with said socket section.

4,016,909

DEVICE FOR FASTENING THE REED TO THE SLAY OF A LOOM

Allan William Henry Porter, Lustmuhle, Switzerland, assignor to Aktiengesellschaft Adolph Saurer, Arbon, Switzerland

Filed Jan. 16, 1976, Ser. No. 649,688
Claims priority, application Switzerland, Jan. 24, 1975, 00899/75
Int. Cl.² D03D *49/60*, *49/62*
U.S. Cl. 139—188 R **10 Claims**



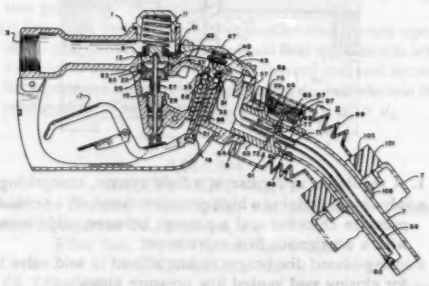
1. Device for fastering the reed of a loom onto the elongated slay beam of the loom, comprising: a slay beam having a longitudinal axis extending along the length of a row of reed blades; a reed comprising a plurality of reed blades arrayed in a row and an elongated rib on which one end of each said reed blade is supported; a hardenable compound placed along said rib and in which all said reed blade one ends are embedded to form an integral unit among said reed blades and said rib; said rib being positioned adjacent to said slay beam; a plurality of pressure flanges arrayed in a row along said rib on the side thereof away from said slay beam; said pressure flanges being shaped and located along said rib such that a said pressure flange is over every said reed blade; pressure flange fastening means securing said pressure flanges against said rib and said rib against said slay beam, thereby squeezing said rib against said slay beam.

4,016,910

FUEL DISPENSING NOZZLE WITH AUTOMATIC SHUT-OFF RESPONSIVE TO VAPOR PRESSURE

Janis Dumpis, St. Ann, and Grenville G. Sutcliffe, Villa Ridge, both of Mo., assignors to Husky Corporation, Pacific, Mo.

Filed Sept. 4, 1975, Ser. No. 610,460
Int. Cl.² B65B *3/04*
U.S. Cl. 141—226 **11 Claims**



1. In a liquid dispensing nozzle, a body having an inlet, an outlet and liquid passage means therebetween including a main valve controlling the flow of liquid from said inlet to said outlet, means resiliently biasing said main valve closed, a spout connected to said outlet and adapted for insertion in the

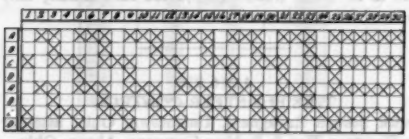
inlet opening of a tank, manually actuated means for opening said main valve against said resilient means, Venturi means in said fuel passage means including a vacuum take-off, a vacuum chamber, means connecting said Venturi vacuum take-off to said vacuum chamber, means responsive to vacuum within said chamber caused by the flow of liquid through said Venturi means operatively connected to said manually actuated means for releasing the same and thereby permitting said resilient means to close said main valve, vent passage means communicating with said vacuum chamber to render said vacuum-responsive means inoperative when said vent passage is open and having a port insertible in the tank with said spout, said vent passage means including a normally open vent control valve, gas conduit means entirely separate from said vent passage means whereby gas pressure in said gas conduit means is unaffected by fluctuations in vacuum in said vent passage means resulting from variations in the rate of flow of liquid through said Venturi means and adapted for sealed communication with the tank inlet opening, a piston exposed directly to gas pressure conditions in said gas conduit means and arranged to close said vent control valve when gas pressure within the tank and said conduit means exceeds a predetermined value, whereby when said port is submerged or when such predetermined pressure conditions occur to close said vent control valve and thereby block said vent passage means, said vacuum-responsive means becomes operative to release said manually-operated means and thereby permit said resilient means to close said main valve.

4,016,911

WOVEN ROPE

Robert Looker, Carpinteria, Calif., assignor to Satron, Inc., El Segundo, Calif.

Filed Mar. 17, 1975, Ser. No. 558,911
Int. Cl.² D03D *1/00, 3/00*
U.S. Cl. 139—383 R **29 Claims**



1. Woven rope comprising a multiplicity of warp strands extending in a longitudinal orientation and at least one weft strand interwoven with said warp strands to form a generally circular woven rope;

said weft strand being inwardly of the outer surface of outer warp strands;

said weft strand extending continuously and progressively along the length of said warp strands; and

said weft strand being under tension to pull said warp strands radially inwardly into a generally circular orientation.

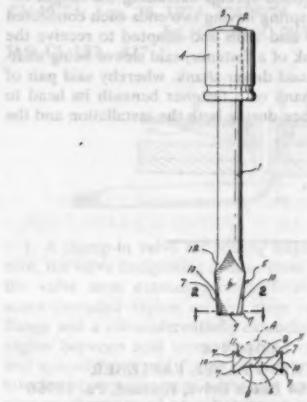
4,016,912

SCREWDRIVER FOR SLOTTED HEAD SCREW

Lionel St-Amour, 604 Francoise Loisel St., Boucherville, Quebec, Canada

Filed Dec. 15, 1975, Ser. No. 640,624
Int. Cl.² B25B *15/00*
U.S. Cl. 145—50 A **6 Claims**

1. A screwdriver for a screw having a slot of predetermined length and predetermined width on the head thereof, said screwdriver comprising a shank, a handle and a screwdriving bit fixed at the opposite ends of said shank, said screwdriving bit having opposite faces converging toward each other lengthwise of said shank and toward a cooperatively formed straight outer edge extending lengthwise transversely of said shank, having an overall length exceeding the predetermined length of said slot, and having a central portion of even thickness not exceeding said predetermined width and of a length less than said predetermined length, said opposite faces having opposite lateral edges extending lengthwise longitudinally of said shank, protuberances on said opposite faces at said opposite lateral edges ending lengthwise of said shank outwardly coextensive with said straight outer edge, and said bit at said straight outer edge progressively increasing in thickness at both ends of the outer edge, from said central portion of even thickness to the corresponding ends respectively of the straight outer edge, thereby producing tight engagement of part of said ends of increased thickness in the opposite ends of said slot.

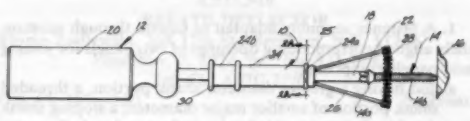


4,016,913

HOLDING DEVICE FOR SCREW DRIVERS AND THE LIKE

Raymond L. Anderson, 1419 Lexington St., Covington, Ky. 41016

Filed Apr. 12, 1976, Ser. No. 676,222
Int. Cl.³ B25B *15/00, 23/08*
U.S. Cl. 145—52 **15 Claims**



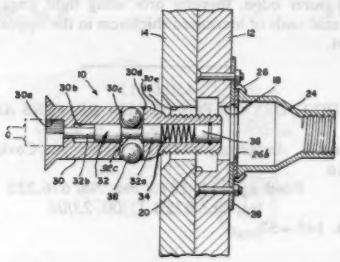
1. A driver having a fastener driving end, a shank portion and a fastener holding device mounted thereon, said fastener holding device comprising a sleeve adapted to fit over said shank portion, a pair of diverging arms at the forward most end of said sleeve, and a pair of coiled springs extending the length between said arms, each spring having two ends each connected to a respective one of said arms and adapted to receive the head and grip the shank of a fastener, said sleeve being shiftable longitudinally of said screw driver shank, whereby said pair of springs engages the shank of a fastener beneath its head to hold the fastener in place during both the installation and the removal thereof.

15. A holding device to be used with tools such as screw drivers, nut drivers, Allen wrenches and the like, and to hold or attach any type of fastener to the appropriate driver at any angle while placing or removing fasteners in parts or materials comprising a sleeve adapted to fit over a shank portion of the driver, a pair of diverging arms at the forwardmost end of said sleeve, and a pair of coiled springs extending the length between said arms, each spring having two ends each connected to a respective one of said arms and adapted to receive the head and grip the shank of a fastener, said sleeve being shiftable longitudinally of said driver shank, whereby said pair of springs engages the shank of a fastener beneath its head to hold the fastener in place during both the installation and the removal thereof.

4,016,914
SELF-LOCKING PANEL FASTENER

Mieczyslaw J. Zurko, 64 Dutch Drive, Holland, Pa. 18966

Filed June 26, 1975, Ser. No. 590,652
Int. Cl.² F16B 39/22
U.S. Cl. 151—41.76 4 Claims



1. A fastener assembly adapted to extend through substantially aligned corresponding openings of two panels for joining said panels comprising:

a stud having a greater diameter shank portion, a threaded shank portion of smaller major diameter, a sloping shank shoulder between said shank portions, a head of greater diameter than and located at the end of the stud nearest said greater diameter shank portion, a longitudinal bore, and a transverse bore within said greater diameter shank portion and intersecting said longitudinal bore;

a plurality of ball detents movable in said transverse bore between a retracted position within said stud and a protruding position;

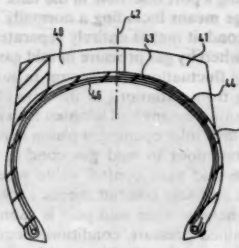
locking means movable in said longitudinal bore for movement between a first position wherein said ball detents are urged to said protruding position and a second position wherein said ball detents are free to assume said retracted position; and

a stud receptacle secured to one of said panels including a basket nut member movably secured to a nut cage, said basket nut member having a reduced diameter threaded portion threadingly engaging said smaller diameter threaded shank portion of said stud, said basket nut member further forming first and second juxtaposed holes wherein the diameter of said first hole engages said ball detents while in said protruding position, and wherein the diameter of said hole will admit said greater diameter shank portion of said stud while said ball detents are in said protruding position.

4,016,915
PNEUMATIC TIRES

Edward Pryce Astley; Owen Morris Jones, both of Liverpool, and Kenneth William Law, Frodsham, all of England, assignors to Dunlop Limited, London, England

Filed May 12, 1975, Ser. No. 576,428
Claims priority, application United Kingdom, May 24, 1974, 23288/74
Int. Cl.² B60C 9/04, 9/20
U.S. Cl. 152—355 7 Claims

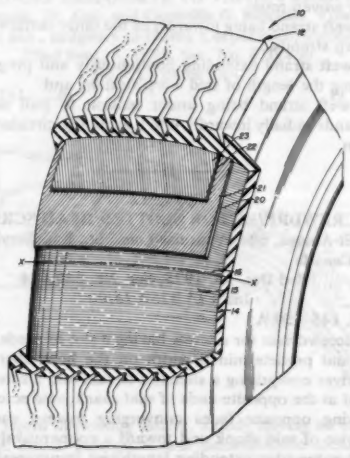


1. An off the road tire comprising a tread portion, sidewall portions and beads, the tread portion having a tread pattern comprising a plurality of bars arranged herringbone fashion about the midcircumferential plane of the tire, the tire being reinforced by a plurality of plies of cord fabric wherein at least one of said plies comprises cords of polyester fiber while the radially outermost ply of said plurality of plies underlying the tread of the tire comprises cords of a first polyamide fiber extending on both sides of the mid-circumferential plane, and a further strip of polyamide cord fabric of opposite bias angle to the cords of said first polyamide fiber ply superimposed thereon to lie under tread bars located substantially only to one side of the midcircumferential plane.

4,016,916
TIRE PLY STEER CONTROL

Frederick Joseph Ravagnani, Uniontown, Ohio, assignor to The Firestone Tire & Rubber Company, Akron, Ohio

Filed Apr. 7, 1975, Ser. No. 565,895
Int. Cl.² B60C 9/18
U.S. Cl. 152—361 R 2 Claims



1. A pneumatic tire comprising, tread means, body ply means, and at least two stabilizer plies interposed between

said tread means and said body ply means, the innermost of said stabilizer plies having a crown angle of approximately 54°, whereby the ply steer force of the tire is substantially zero, and the outermost of said stabilizer plies having a crown angle of approximately 80° and being oppositely angularly biased with respect to the innermost of said stabilizer plies.

4,016,917

RIM AND BEAD-CLAMP CONSTRUCTION FOR PNEUMATIC TIRES

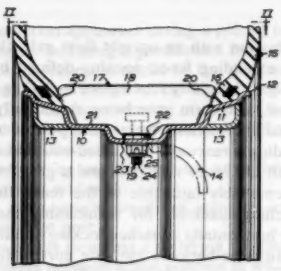
Carl-Gustav Börje Christer Victor, Hollviksnas, Sweden, assignor to Trelleborgs Gummifabriks Aktiebolag, Trelleborg, Sweden

Filed Mar. 10, 1975, Ser. No. 557,146

Claims priority, application Sweden, Mar. 11, 1974, 7403187

Int. Cl.³ B60C *5/16, 15/02*

U.S. Cl. 152—400 **3 Claims**



1. A rim and bead clamp construction comprising a rim with flanges and a rim bottom and several bead clamps spaced about the circumference of said rim, each of said bead clamps being formed as an elongated rigid body, jaw means on the distal ends of each of said bead clamps applying radially inward and axially outward forces against the beads of a pneumatic tire to be mounted on said rim to force the beads out against the flanges of said rim and to maintain an airtight seal between the bead and the rim even when the tire is in a partially deflated condition, a clamping bolt connected to and extending from each of bead clamps and arranged centrally between its ends, bottom wall portions of the rim bottom of said rim defining an aperture for said clamping bolt of each of said bead clamps, and resilient gasket means around said clamping bolt of each of said bead clamps, said bead clamps being rotatable in the interior of the tire from a tire-mounting position where their elongated directions coincide with the plane of rotation of the rim to an operative clamping position where their elongated directions extend in the axial direction of said rim, said bead clamps while in said clamping position having shoulders which are pressed against the bottom of said rim to stabilize the bead clamps and prevent them from tilting during run flat driving, said bead clamp having a central surface area spaced from the rim in the area surrounding said clamping bolt, said central surface area pressing said resilient gasket against the bottom of the rim to provide an air-tight seal around the clamping bolt when shoulders are pressed against the bottom of said rim, said rim having a recess which provides the spacing between the rim and the central surface area of the bead clamp.

4,016,918

CLAMP IN VALVES

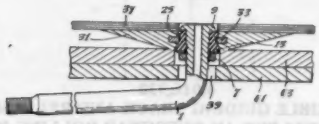
Stephen Ernest William Thacker, Lynn Stonnal, England, assignor to Scovill Manufacturing Company, Waterbury, Conn.

Filed May 14, 1975, Ser. No. 577,593

Claims priority, application United Kingdom, May 21, 1974, 22649/74; Aug. 28, 1974, 37688/74

Int. Cl.² B60C *29/00*

U.S. Cl. 152—427 **9 Claims**



1. A clamp-in valve for sealing engagement with an aperture, the valve comprising a valve stem, a flange at one end of the valve stem extending circumferentially of the stem, a screw-threaded region on the stem remote from said end flange and a circumferentially extending rib on the stem at a region between said screw-threaded region and said flange and spaced from said flange, a lock washer on the stem for interference engagement with said stem rib, a grommet of elastomeric material round the stem and disposed between said lock washer and said stem flange, a flange on the grommet at its end remote from said stem flange, a screw-threaded member engaging said screw-threaded region of the stem for tightening down against such lock washer to urge it towards the stem flange, the diameter of the stem flange being less than that of the aperture into which the valve is to be clamped and the grommet being insertable into said aperture with the screw-threaded member and lock washer in a first position, said tightening-down of the screw-threaded member displacing the member and the lock washer from said first position towards the stem flange and forcing the lock washer into its interference engagement with said rib to bear on said grommet flange and compress the grommet to clamp the valve sealingly in the aperture.

4,016,919

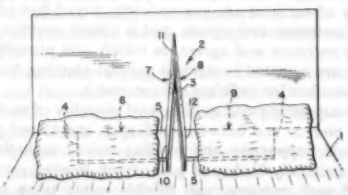
BREATH DEFLECTOR

Emma Zmijewski, 268 17th St., Brooklyn, N.Y. 11215

Filed Nov. 7, 1974, Ser. No. 521,748

Int. Cl.² A47C *21/00*

U.S. Cl. 160—130 **5 Claims**



1. A collapsible breath deflector for placing between two adjacent pillows on a bed comprising:

a rectangular surface sheet having end edges and side edges;

the end edges of a length substantially equivalent to the pillow width;

three folding lines connecting the side edges to form two end and two middle rectangular areas foldably connected to each other;

the two end areas are of equal size and shape;

the two middle areas are of equal size and shape;

the end areas and middle areas of a size and shape such that when the two end areas are placed underneath the two

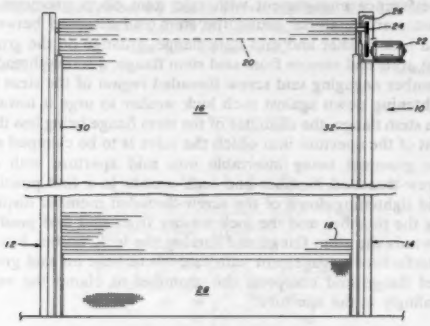
pillows adjacent to each other the two middle areas fold to a height above the bed and at an angle to the bed sufficient to deflect, but not reflect, a person's breath lying on one pillow from a person lying on the adjacent pillow; whereby the breath deflector can be folded and collapsed flat so that it can be easily stored.

4,016,920

FLEXIBLE GUIDING TRACK AND RELEASE MECHANISM FOR AN OVERHEAD ROLLING DOOR ASSEMBLY

James N. Shepard, Concord, Calif., assignor to United States Steel Corporation, Pittsburgh, Pa.

Filed May 23, 1975, Ser. No. 580,387
Int. Cl.² E06B 9/14
U.S. Cl. 160—133 **5 Claims**



1. A sectional door assembly comprising:

means defining a support frame located proximate the periphery of an opening with which said door assembly is associated;

means defining a door composed of a plurality of sections attached to one another such that they are collectively movable between an open position, for permitting entrance and egress through such opening, in which said plurality of sections are conveniently stored out of the path of entrance and egress, and a closed position, for denying entrance and egress, in which said plurality of sections are oriented in stacked parallel abutting fashion to one another for defining a door; and

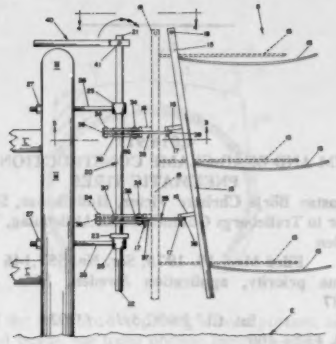
means for supporting and guiding said plurality of sections at their ends at and between said open and closed positions, said supporting and guiding means including a flexible generally U-shaped guide track located on both sides of such opening, said flexible guide track being supported on both sides of such opening substantially totally from the closed end thereof, said guide track having a greater flexibility than said sections, such that one or more of said sections retained within said guide track will be released from said flexible guide track, in either of the two directions which are orthogonal to the plane established by said sections in their closed positions, when a force is applied to said one or more of sections which is otherwise sufficient to flex said sections, said one or more sections being released from said generally U-shaped guide track before said sections are substantially flexed and possible damage results to said one or more sections or to said guide track.

4,016,921

LATCHING MECHANISM ADAPTABLE FOR USE WITH STRETCHABLE FARM GATES

Clarence H. Ericksen, R.R. No. 2, Neola, Iowa 51559

Filed Sept. 19, 1975, Ser. No. 614,881
Int. Cl.² E06B 3/80
U.S. Cl. 160—328 **9 Claims**



1. In combination with an upright farm gate closure for a longitudinally extending fence opening defined by a pair of separated upright stationary fence posts including a fore-post and a rear-post, said farm gate being structurally longitudinally horizontally stretchable between a pair of upright gate terminii including a rearward restrained-end that is pivotably associated with the fence rear-post and a gate forward free-end that is removably latchable to the fence fore-post, an improved latching assembly for maintaining the gate in a longitudinally horizontally stretched locking-station condition wherein the distance between the gate upright free-end and the fence fore-post is minimized, said latching mechanism assembly comprising:

A. An upright elongate lineal shaft having a top-end and a bottom-end, said upright shaft being offset from and rotatably secured to the fore-post and wherein said shaft is rotational about the shaft vertical-axis for an angular extent of about 170°–190° commencing at a latching-station and terminating at a locking-station;

B. A pair of vertically separated radial lugs attached rigidly to and extending radially outwardly from the upright shaft whereby the shaft and lugs are co-rotatable about the shaft vertical-axis;

C. A pair of C-shaped horizontal link members and each having its first-end pivotably attached to a lug at a location radially outwardly from the upright shaft;

D. A pair of vertically separated dogs attached to the gate free-end and forwardly offset therefrom whereby the dogs are removably associatable with said lugs when the gate free-end is at rearward latching-station;

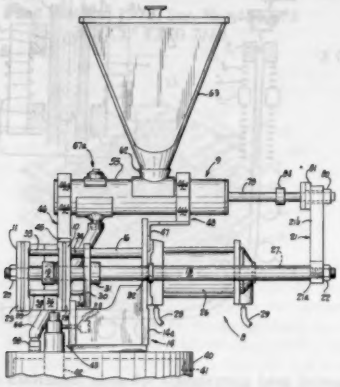
E. Bifurcate handle means pivotably attached to the upper portion of said upright shaft to facilitate rotation thereof whereby the C-shaped members pivotably restrained first-ends are caused to move from rearward latching-station to the forward locking-station; and

F. Said bifurcate handle means being pivotal about a horizontal pivot-pin on the upright shaft and from there to surround both sides of the gate columnar free-end to provide an arresting means to arrest rotation of the upright shaft after the gate dogs have attained said forward locking-station.

4,016,922
METHOD AND APPARATUS FOR FEEDING GRANULATED MATERIAL

John H. Simmons, Euclid, and Donald A. Daugherty, Lyndhurst, both of Ohio, assignors to Precision Metalsmiths, Inc., Cleveland, Ohio

Filed Mar. 31, 1976, Ser. No. 672,524
Int. Cl.² B29F 1/06
U.S. Cl. 164—45 13 Claims



1. In an injection apparatus having a pair of relatively movable dies, means including a pressurized heated tank for supplying molten injection material to the dies, and means for causing relative movement of the dies between open and closed positions, the improvement of a feeder for periodically supplying charges of solid granules of injection material to said tank, said feeder comprising:

a. a housing having an inlet port and an outlet port communicating with said tank,

b. means containing a supply of granules communicating with said inlet port;

c. transfer means including a metering chamber movable in said housing between a first position in which said chamber receives a quantity of granules admitted through said inlet port and a second position in which said chamber discharges a charge of granules through said outlet port.

d. means for actuating said transfer means, and

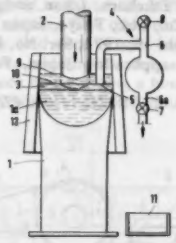
e. means for pressurizing said metering chamber to fluidize the granules of injection material contained therein.

4,016,923
PROCESS FOR HOT TOPPING BY ELECTRO-SLAG-REMELTING

Hermann Maas, Bochum, and Georg von Bormann, Kaarst, both of Germany, assignors to August Thyssen-Hutte AG, Duisburg-Hamborn, Germany

Filed Aug. 20, 1975, Ser. No. 607,123
Claims priority, application Germany, Aug. 23, 1974, 2440360
Int. Cl.² B22D 23/02
U.S. Cl. 164—52 8 Claims

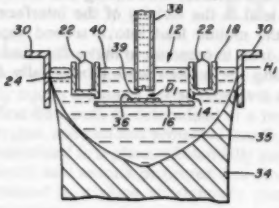
1. In an electro-slag-remelting process wherein a mass of steel in the form of an electrode is remelted while inserted in slag to produce an ingot and at the end of said remelting carrying out a hot topping process wherein said electrode is supplied with a reduced power as compared to that achieved during said remelting while inserted in said slag, the improvement which comprises subsequent to said electro-slag-remelting and prior to said hot topping removing a portion of said slag.



4,016,924
METHOD OF CONTINUOUS CASTING WITH WEIGHTED FLOAT-DISTRIBUTOR

Ralph D. Maier, Monroeville, Pa., assignor to Aluminum Company of America, Pittsburgh, Pa.

Filed Sept. 17, 1975, Ser. No. 614,090
Int. Cl.² B22D 11/10
U.S. Cl. 164—82 12 Claims



1. In a method of continuously casting ingot wherein molten metal is continuously supplied to the entrance of an open-ended substantially vertical mold and an ingot is withdrawn from the mold exit, and wherein heat is extracted from said ingot by direct chill application, and wherein the supply of molten metal to the mold is controlled at a rate substantially commensurate with that of ingot withdrawal by cooperation between a molten metal supply nozzle and a float-distributor means responsive to molten metal level within the mold, said float-distributor being maintained afloat in the surface portions of the molten metal, the improvement comprising the steps of:

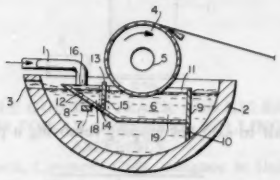
a. downwardly urging said float-distributor means to cause said float-distributor means to float lower in the molten metal, thereby causing a relatively high molten metal level within the mold; and

b. thereafter decreasing the downward urging of the said float-distributor means to cause said float-distributor means to float higher in the molten metal thereby to cause a reduced height of molten metal within the mold, said decreasing of the downward urging of said float-distributor means causes a reduction in the rate of molten metal introduction into the mold to establish a instability condition with respect to molten metal feed and ingot withdrawal rate after which said float-distributor means settles downwardly as a result of decreasing molten metal level in said mold during said instability condition, stability between molten metal feed and ingot withdrawal rates being re-established at said reduced molten metal height, and continuing the casting operation while substantially maintaining said reduced height of molten metal in said mold.

4,016,925
METHOD FOR CONTINUOUSLY MANUFACTURING ENDLESS LEAD SHEET

Tokunobu Sumida, Takehara, Japan, assignor to Mitsui Mining & Smelting Co., Ltd., Tokyo, Japan

Filed Feb. 19, 1974, Ser. No. 443,636
Claims priority, application Japan, Feb. 23, 1973, 48-23478[U]
Int. Cl.² B22D 11/06, 43/00
U.S. Cl. 164—87 3 Claims



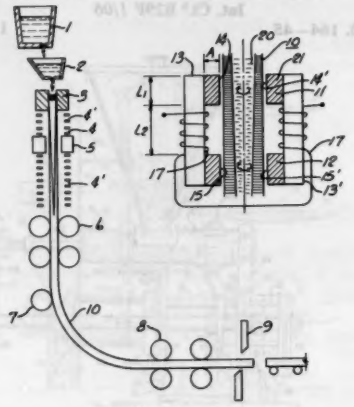
1. In a method for continuously manufacturing an endless lead sheet from which a cathode starting sheet to be used in electrolytic refining of lead is prepared, including the steps of casting molten lead on a rotating drum to form a sheet and stripping and winding up the cast sheet, an improvement characterized by introducing molten lead containing dross continuously into a first separation zone, causing the dross to come up to the surface, introducing the dross together with the molten lead in the vicinity of the interface between the dross and the molten lead into a second separation zone, causing the dross to come up to the surface and accumulating it, introducing the molten lead substantially free from the dross into a casting zone for casting.

4,016,926
ELECTRO-MAGNETIC STRIRRER FOR CONTINUOUS CASTING MACHINE

Naohei Yamada, Tokyo; Katsuhiko Yamada, and Teruo Fujita, both of Itami, all of Japan, assignors to Sumitomo Electric Industries, Ltd., Osaka, Japan

Filed Mar. 21, 1975, Ser. No. 560,964
Claims priority, application Japan, Mar. 23, 1974, 49-32961
Int. Cl.² B22D 11/10, 27/02
U.S. Cl. 164—147 3 Claims

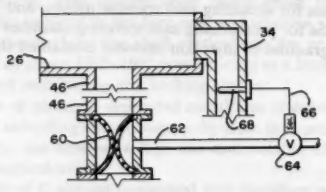
1. A rotary magnetic field stirrer for a continuous casting machine for metals wherein a two-pole rotary magnetic field type stirrer is installed in the secondary cooling zone of the continuous casting machine and has poles symmetrically positioned with respect to the central axis of the cast strand, the improvement comprising at least two opposed pairs of electromagnetic coils each having at least two magnetic poles positioned at different longitudinal positions along the cast strand and respectively positioned facing each other with the cast strand disposed therebetween, electric power source means connected to said coils for flowing a single phase alternating current in one of said pairs of electromagnetic coils and a single phase alternating current of a prescribed phase difference in another of said pairs of electromagnetic coils to thereby impart opposite polarities to said respective magnetic pole pairs facing each other and generate a two-pole rotary magnetic field at at least two locations in the longitudinal direction of the cast strand.



4,016,927
CONDENSER CONTAMINATION REMOVAL ARRANGEMENT

William Earl Palmer, Easton, Pa., assignor to Ingersoll-Rand Company, Woodcliff Lake, N.J.

Filed Mar. 12, 1976, Ser. No. 666,240
Int. Cl.² F28F 11/00; F28B 9/08
U.S. Cl. 165—70 4 Claims



1. In a surface condenser having a gas inlet and a condensed gas outlet: a plurality of separate compartments, each containing a plurality of hollow tubes over which the gas is flowed; means for feeding cooling liquid through the tubes to condense the gas; condensed gas collectors located in the separate compartments for collecting condensed gas; a first liquid conduit extending from the condensed gas collectors in each separate compartment to remove the condensed gas from each compartment; a second liquid conduit having a normally closed valve also extending from said condensed gas collectors; a contamination sensor located in each first liquid conduit for sensing any contamination in the liquid flowing through said liquid conduit from the compartment to which the particular liquid conduit is connected; and means responsive to the sensing of contamination by any particular contamination sensor to open the normally closed valve in the partic-

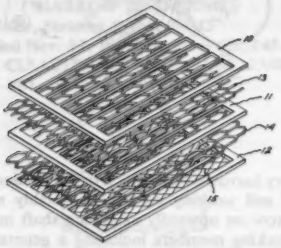
ular second liquid conduit extending from the same compartment.

4,016,928

HEAT EXCHANGER CORE HAVING EXPANDED METAL HEAT TRANSFER SURFACES

Eugene L. Bartels, Kettering, Ohio, and Robert B. Fleming, Scotia, N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Dec. 26, 1973, Ser. No. 428,075
Int. Cl.² F28D 7/10
U.S. Cl. 165—141 **3 Claims**



1. A heat exchanger core for transferring heat between at least two counterflowing fluid streams comprising a plurality of high conductivity expanded metal members, each such member with a mechanically continuous structure having a plurality of interstices and having approximately 70 percent open area, said interstices having major and minor axes, a plurality of low conductivity thermoplastic separators interleaved with said expanded metal members, each separator having a rectangular shape and a peripheral portion and transverse elements defining fluid flow channels, said separator members and said expanded metal members oriented with respect to each other such that the major axes of said interstices are perpendicular to said transverse portions, the material of the separator penetrating the interstices of the expanded metal members at the points of contact between the expanded metal members and peripheral portion and transverse elements of the separators, the separator material thereby bonding the separator to the expanded metal members, and the separators being aligned, thereby providing at least a pair of mutually isolated fluid flow channels through the heat exchanger core.

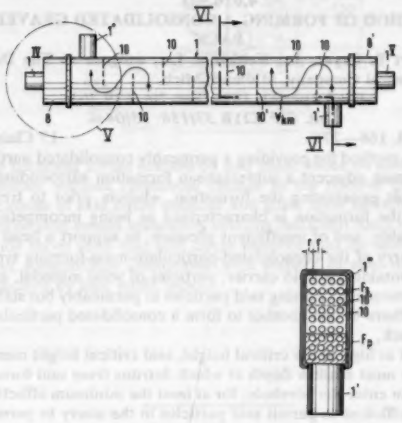
4,016,929

HEAT-EXCHANGER

Ulrich Pflüger, and Klemens Waterkotte, both of Herne, Germany, assignors to Pfluger Apparatebau GmbH & Co. KG, Herne, Germany

Filed June 5, 1975, Ser. No. 583,835
Claims priority, application Germany, June 8, 1974, 2427808
Int. Cl.² F28D 7/00; F28F 9/22
U.S. Cl. 165—159 **12 Claims**

1. A heat-exchange arrangement, comprising a housing of substantially rectangular cross-sectional configuration having an inner surface which defines a first flow path for a fluid to undergo heat-exchange; a plurality of spaced, substantially parallel conduits in said first flow path defining a series of second flow paths for a medium to undergo heat-exchange with a fluid flowing in said first flow path, said conduits being arranged such that the most closely adjacent ones thereof are spaced from one another by substantially the same predetermined distance and such that the spacing between said inner surface and the conduits most closely adjacent thereto substantially equals said predetermined distance; at least one wall in said housing, said one wall bounding said first flow path at a longitudinal end thereof; and a plurality of axially spaced baffles in said first flow path for regulating the flow pattern of a fluid flowing in said first flow path, adjacent ones of said baffles, as well as said wall and the baffle adjacent thereto, defining with one another flow regions for a fluid flowing in said first flow path, and each of said baffles having an edge which is spaced from said inner surface and together with the latter defines a space connstituting a boundary area between the respective neighboring regions, said baffles being arranged



in such a manner that a first projected free flow cross-section of said first flow path as determined in any one of said regions approximately equals a second projected free flow cross-section of said first flow path as determined at a boundary area for said one region, and said first projected free flow cross-section being determined in a plane substantially parallel to said conduits whereas said second projected free flow cross-section is determined in a plane substantially normal to said conduits. component

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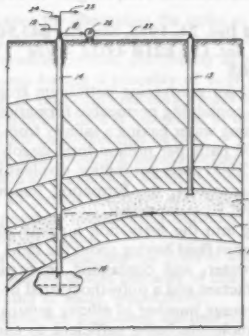
4,016,930

OIL WELL PRODUCING METHOD AND SYSTEM

James F. Arnold, 241 Kilts Drive, Houston, Tex. 77024

Filed Oct. 23, 1975, Ser. No. 624,759
Int. Cl.² E21B 43/25
U.S. Cl. 166—266 **13 Claims**



1. A method for producing oil from an oil producing formation comprising the steps of drilling and completing a well through such formation and establishing a separation zone at a depth deeper than, and in fluid communication with said formation; flowing water into said formation at an injection point offset from said well and causing such water to flow

laterally through said formation into said well; flowing water from a lower portion of said separation zone upwardly through said well to the earth's surface; flowing oil from an upper portion of said separation zone to the earth's surface, and adjusting the rate of flow of water and oil from the separation zone to be such that the level of oil is maintained below said formation.

4,016,931

METHOD OF FORMING A CONSOLIDATED GRAVEL PACK

Herbert B. Cryar, Jr., Keithville, La., assignor to The Dow Chemical Company, Midland, Mich.

Filed Apr. 22, 1976, Ser. No. 679,263
Int. Cl.² E21B *33/138*, *43/04*
U.S. Cl. 166—276 **17 Claims**

1. A method for providing a permeably consolidated particulate mass adjacent a subterranean formation surrounding a borehole penetrating the formation, wherein prior to treatment, the formation is characterized as being incompetent, permeable, and of insufficient pressure, to support a head of

a slurry of the consolidated-particulate-mass-forming type, containing a fluid carrier, particles of solid material, and a means for causing said particles to permeably but stably adhere to one another to form a consolidated particulate pack,

at least as high as the critical height, said critical height meaning the most shallow depth at which detritus from said formation can enter the borehole, for at least the minimum effective time sufficient to permit said particles in the slurry to permeably but stably adhere to one another, comprising:

a. emplacing in the formation via the borehole, a gel of the self-breaking type, said gel being effective to adequately temporarily plug the formation to permit a head of said slurry to be supported to at least the critical height for at least the minimum effective time;

b. filling said borehole with said slurry to a height at least as high as the critical height;

c. permitting said particles to permeably but stably adhere to one another to form a consolidated particulate pack; and

d. permitting said gel to break.

4,016,932

SURFACTANT OIL RECOVERY METHOD FOR USE IN HIGH TEMPERATURE FORMATIONS CONTAINING WATER HAVING HIGH SALINITY AND HARDNESS

George Kalfoglou, Houston, Tex., assignor to Texaco Inc., New York, N.Y.

Filed Dec. 24, 1975, Ser. No. 643,965
Int. Cl.² E21B *43/22*, *43/24*
U.S. Cl. 166—303 **19 Claims**

12. A method for recovering petroleum from a subterranean petroleum-containing permeable formation, said formation also containing water having a salinity from about 40,000 to about 120,000 parts per million total dissolved solids and from 3,000 to 12,000 parts per million divalent ions including calcium and magnesium, the formation temperature being from 100° to 150° F., comprising:

a. introducing into the formation a saline surfactant-containing aqueous fluid having about the same salinity as the formation water, and containing an organic sulfonate anionic surfactant and a polyethoxylated nonionic surfactant, the average number of ethoxy groups per nonionic surfactant molecule being sufficient to cause the cloud point of the polyethoxylated nonionic surfactant in an aqueous solution having about the same salinity and divalent ion concentration as the formation water to be from 1° to 20° F. greater than the temperature of the formation; and

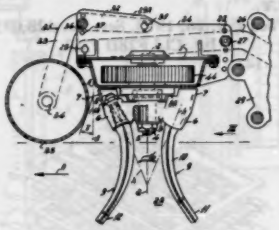
b. recovering oil displaced by the surfactant solution from the formation.

4,016,933

ROTARY HARROWS

Cornelis van der Lely, 7, Bruschenrain, Zug, Switzerland

Filed Feb. 27, 1975, Ser. No. 553,606
Claims priority, application Netherlands, Mar. 1, 1974, 7402787
Int. Cl.² A01B *33/00*
U.S. Cl. 172—59 **26 Claims**



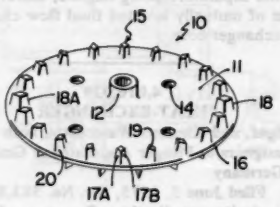
1. A rotary harrow comprising a frame portion supporting a number of soil working members rotatably mounted in a transverse row on upwardly extending shaft means, each of said soil working members including a generally horizontal support of elongate configuration and a sleeve-like tine holder at each end thereof, a downwardly extending tine being held in an internal bore that extends through the top and bottom of said holder, said support being rotatable about an axis of rotation defined by said shaft means that is substantially centrally located between the holders on said support, the top of said holder being radially spaced further from said axis of rotation than the bottom thereof at the outer side of that holder, the outer surfaces of said holder being substantially inclined to said axis of rotation.

4,016,934

PACKER WHEEL CONSTRUCTION

Fred J. Schneider, P.O. Box 940, Eston, Saskatchewan, Canada

Filed July 28, 1975, Ser. No. 599,646
Int. Cl.² A01B *21/04*
U.S. Cl. 172—555 **1 Claim**



1. A packer wheel for use with agricultural implements comprising a disc, a central hub formed on said disc and extending outwardly on each side thereof for supporting said wheel for rotation upon an associated supporting axle, and a plurality of packer lugs formed adjacent to but spaced inwardly from the periphery of said disc and extending outwardly upon each side of said disc, each of said lugs having four sides with each side inclined away from the center of said lug from the other end of said lug toward the inner end thereof thus giving additional strength of said lugs at the junction between said lugs and said disc, the outer ends of said lugs being flattened thus forming a frustum of a four sided pyramid, adjacent ones of said four sides of each of said lugs meeting to form relatively sharply defined edges, two of the opposing edges of each of said lugs lying on a radial line

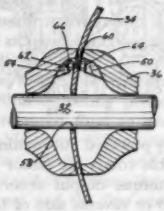
extending from the center of said hub to the periphery of said disc, the other two opposing edges of each of said lugs lying on a circular line parallel to and spaced inwardly from the outer periphery of said disc, said periphery of said disc being rounded when viewed in cross section, said hubs extending outwardly from said disc a distance slightly more than the distance that said lugs extend outwardly, said lugs on both sides of said disc being substantially the same distance from the axis of said disc, but the lugs on one side of said disc being staggered circumferentially relative to the lugs on the other side of said disc.

4,016,935

HARROW DISC GANG

Maurice E. Miller, Stratton, Nebr. 69043

Filed Nov. 11, 1975, Ser. No. 631,145
Int. Cl.² A01B *7/00, 15/16, 21/08, 23/06*
U.S. Cl. 172—601 **5 Claims**



1. A disc section for a disc harrow including a frame means, comprising,
an elongated shaft rotatably secured to said frame means,
said shaft having a circular cross section,
a plurality of spaced-apart disc blades mounted on said shaft for rotation therewith,
a plurality of spool members mounted on said shaft,
one of said spool members being mounted between adjacent pairs of disc blades,
and means on said disc blades and said spool members for preventing relative rotation therebetween as the disc harrow is moved through a field,
each of said spool members comprising a center section having end portions extending outwardly therefrom,
each of said spool members having a central opening formed therein which receives said shaft,
said means on said spool members and disc blades comprising a lug means on each of said end portions which extends toward the adjacent disc blade,
each of said disc blades having a central opening formed therein which receives said shaft,
each of said disc blades having a bolt opening formed therein outwardly of its central opening,
and a bolt positioned in each of said bolt openings having a head at one side of the disc blade and a nut at the other side of the disc blade, said bolt being secured only to said disc blade, said head and said nut abutting against the lugs on adjacent spool elements to prevent rotation therebetween as the disc harrow is moved through the field.

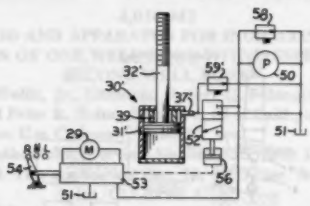
4,016,936

MOTOR GRADER HAVING IMPROVED GUIDE SHOES FOR CIRCLE-MOUNTED IMPLEMENT

Gene B. Easterling, Decatur, Ill., and Joseph L. Strabala, Orinda, Calif., assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed Apr. 24, 1975, Ser. No. 571,118
Int. Cl.² E02F *3/76*
U.S. Cl. 172—796 **10 Claims**

1. A motor grader including a main frame mounted on wheels, a drawbar structure attached to said main frame, a circle member carrying a working implement and a plurality of guide shoes supporting said circle member under said drawbar structure; each of said guide shoes including generally vertically aligned surfaces in face to face mating engagement at all times with both upper and lower surfaces respectively of said circle member and each of said plurality of guide shoes including remotely controlled mechanical means for varying



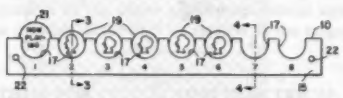
the frictional forces exerted by said guide shoes on said circle member without substantial change in the relative physical locations of said circle member and guide shoe surfaces, said mechanical means selectively exerting sufficient force on said guide shoes such that said circle member may be selectively held substantially immovable with respect to said drawbar structure by said guide shoes.

4,016,937

APPLIANCE FOR COIN-OPERATED DEVICES

Norman J. Abraham, 12524 Lorain Ave., Cleveland, Ohio 44111

Filed Aug. 18, 1975, Ser. No. 605,512
Int. Cl.² A63F *9/00*
U.S. Cl. 273—1 R **25 Claims**

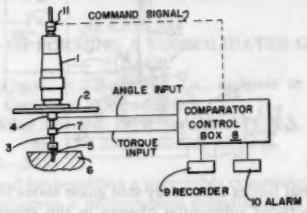


1. An appliance for illustrating the order of prospective use by a plurality of sequential users of a coin-operated device having coin receiving means, comprising in combination:
support means having a plurality of coin retaining means with each of said coin retaining means being capable of retaining a coin which is insertable in the coin receiving means of the coin-operated device;
each of said coin retaining means having a coin inserting and withdrawing aperture which exceeds the diameter of the coin to permit insertion and withdrawal of a coin without physical interference between a coin and said coin retaining means;
display means for displaying the order in which a plurality of coins are placed in said plurality of coin retaining means by a plurality of users, respectively;
indicator means for indicating the one of said plurality of coin retaining means corresponding to the present user of the coin-operated device;
and means mounting said display means and said indicator means for enabling inspection thereof to indicate the order of prospective use of the coin-operated device by the plurality of users in accordance with said display means and said indicator means.

4,016,938
METHOD FOR FASTENER TENSIONING

Edwin Eugene Rice, Ann Arbor, Mich., assignor to Ingersoll-Rand Company, Woodcliff Lake, N.J.

Filed Dec. 2, 1975, Ser. No. 636,984
Int. Cl.² B23Q *19/06*
U.S. Cl. 173—1 7 Claims

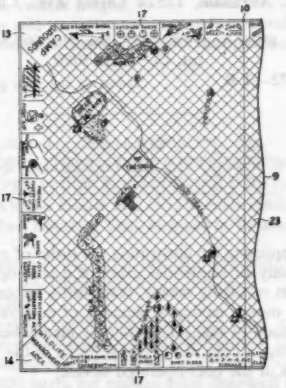


1. Apparatus for threaded fastener tensioning comprising:
a power wrench for rotating the fastener;
differentiating means for determining when the fastener has been rotated into its non-proportional range in tension and stopping the power wrench;
rotation means for untightening the fastener a predetermined rotary angle using the fastener thread as a means of fastener strain measurement; and
means for stopping the power wrench after said fastener is untightened said predetermined rotary angle.

4,016,939
BOARD GAME APPARATUS

Harry Marshall Thron, Rte. 2, Box 73, Glencoe, Md. 21152

Filed July 28, 1975, Ser. No. 599,888
Int. Cl.² A63F *3/00*
U.S. Cl. 273—134 AT 9 Claims

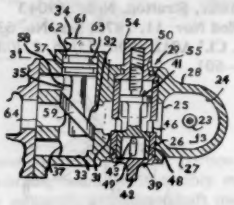


1. A game apparatus comprising:
a. a playing board depicting an area divided into a plurality of progress spaces and surrounded by a plurality of lesson spaces for instructional purposes;
b. means for selectively displaying a quarry dimensioned to, positionable upon, and movable about said progress spaces;
c. a plurality of pictorial representations of a plurality of specific items of equipment that each player may selectively employ in the play of the game;
d. means for indicating the position of the game players dimensioned to and positionable upon said progress spaces;
e. a deck of cards to provide a number of situations that when drawn by the player will alter the play of the game;
f. chance means to determine the number of progress spaces a player moves his player position indicating means and to determine the rapidity of selection of each player's pictorial representations of items of equipment.

4,016,940
PNEUMATIC NUT RUNNER HAVING A DIRECTIONAL VALVE AND AN AIR REGULATOR

Edward F. Spring, Sr., Mohawk, N.Y., assignor to Chicago Pneumatic Tool Company, New York, N.Y.

Filed Oct. 21, 1975, Ser. No. 624,483
Int. Cl.² B23B *45/04;* E03B
U.S. Cl. 173—169 14 Claims

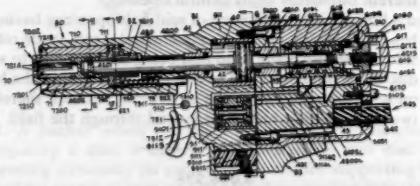


1. A pneumatically powered nut running tool comprising in a housing, a reversible rotary air motor for providing a forward or a reverse torque output accordingly as live air is applied to a forward or reverse side of the motor; a throttle valve for admitting live air into the housing; a directional valve selectively manipulative for controlling the directional application of the live air to the motor, and a manually operable flow regulating unit positioned between the directional valve and the throttle valve for regulating the volume flow of the live air from the throttle valve to the directional valve, the regulating unit comprising a manipulative cylindrical hollow by-pass valve closed at one end and open at the other and a separately manipulative regulating valve slidably disposed in the by-pass valve, the by-pass valve and the regulating valve each being selectively adjustable relative to the other for determining either a full or a restricted volume air flow to the directional valve.

4,016,941
HAND-SIZE FLUID-POWERED TOOL RECIPROCATOR

William H. Sanders, 3442 Kenwood Blvd., Toledo, Ohio 43606

Continuation-in-part of Ser. No. 339,122, March 8, 1973, abandoned. This application Aug. 11, 1975, Ser. No. 603,787
Int. Cl.² B24B *23/00*
U.S. Cl. 173—170 18 Claims



1. In a tool reciprocator for operation with a source of pressured fluid and a sump, the tool reciprocator having a housing; a fluid-operated reciprocatory motor having cylinder and piston elements on the housing; a pair of motor conduits in communication with spaced points in the motor cylinder element on opposite sides of the motor piston element and with the sump and source of pressured fluid; a pressured fluid responsive and operated movable shifter valve member common to the motor conduits and disposed therein between the motor cylinder element and source of pressured fluid and

sump adapted, when moved to and occupying one position, to connect a motor conduit, communicating with the motor cylinder element on one side of the motor piston element, with the source of pressured fluid and the other motor conduit, communicating with the motor cylinder element on the other side of the motor piston element, with the sump and, when moved to and occupying another position, to connect the first mentioned motor conduit with the sump and the second mentioned motor conduit with the source of pressured fluid and thereby to reciprocate one of the motor elements; a tool engaging part operatively connected to the reciprocative of the motor elements and adapted to be reciprocated thereby; and means for moving the movable shifter valve member to and from the mentioned positions thereof comprising:

a pilot conduit individual to and operatively connected with one end of the mentioned movable shifter valve member and to the source of pressured fluid and to the sump for communicating pressured fluid and for venting spent pressured fluid to and from the mentioned movable shifter valve member end;

a second pilot conduit individual to and operatively connected with the other end of the movable shifter valve member, opposite to the first mentioned shifter valve member end, and to the source of pressured fluid and to the sump for communicating pressured fluid and for venting spent pressured fluid to and from the second mentioned movable valve shifter member end;

a pilot valve member individual to and disposed in the first mentioned pilot conduit between the source of pressured fluid and the sump and the first mentioned end of the movable shifter valve member and supported for movement to and from a first position in closed relation to the sump and open relation to the source of pressured fluid from and to a second position in open relation to the sump and closed relation to the source of pressured fluid and providing, when in the first mentioned position, communication between the source of pressured fluid and the first mentioned end of the movable shifter valve member and, when in the second mentioned position, communication between the sump and the first mentioned end of the movable shifter valve member;

a second pilot valve member individual to and disposed in the second mentioned pilot conduit between the source of pressured fluid and the sump and the second mentioned end of the movable shifter valve member and supported for movement to and from a first position in closed relation to the sump and open relation to the source of pressured fluid from and to a second position in open relation to the sump and closed relation to the source of pressured fluid and providing, when in the first mentioned position, communication between the source of pressured fluid and the second mentioned end of the movable shifter valve member and, when in the second mentioned position, communication between the sump and the second mentioned end of the movable shifter valve member;

means in engagement with the mentioned pilot valve members and operative to bias each of the same to normally occupy the pilot valve member first mentioned position, whereby pressured fluid is normally communicated to and exerts against both ends of the mentioned opposite ends of the movable shifter valve member at the same time; and means operatively connected to and actuated by the reciprocative of the motor elements to individually and selectively move one of the pilot valve members from its respective first mentioned position to the second mentioned position thereof, when the reciprocative of the motor elements approaches a certain stage in a stroke thereof,

whereby the movable shifter valve member responds to the pressured fluid being communicated and exerted on the end of the mentioned opposite ends of the movable shifter valve member through the pilot conduit in which the unmoved pilot valve member is located causing the movable shifter valve member to move from an occupied to an unoccupied position of the mentioned positions thereof with alacrity and substantially coincidentally with the arrival of the reciprocative of the motor elements at the mentioned stage in its stroke and thus to speedily reverse the direction of movement of the reciprocative of the motor elements.

4,016,942

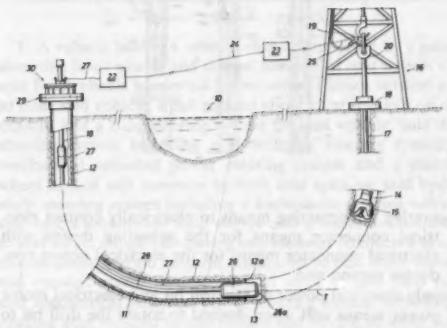
METHOD AND APPARATUS FOR INDICATING THE POSITION OF ONE WELL BORE WITH RESPECT TO A SECOND WELL BORE

David E. Wallis, Jr., Glendale; Robert G. Polansky, La Canada, and Peter R. Rahm, Pasadena, all of Calif., assignors to Trunkline Gas Company, Houston, Tex.

Continuation-in-part of Ser. No. 261,415, June 10, 1972, abandoned. This application Dec. 28, 1973, Ser. No. 429,189

Int. Cl.² E21B *47/12*

U.S. Cl. 175—45 **9 Claims**



5. Apparatus for indicating the position of a drill bit relative to a target point comprising means for generating a signal of a preselected frequency, means for transmitting said signal of a preselected frequency from the drill bit into the ground, a microphone array including a plurality of microphones positioned at the target area and oriented in a known position relative to each other, means providing signals proportional to the phase angles of the signals reaching the microphones, and means responsive to the phase angle proportional signals to indicate the position of the drill bit relative to the target area.

4,016,943

METHOD FOR CONNECTING ELECTRICAL CONDUCTORS FOR ELECTRIC EARTH BORING MEANS

Roy H. Cullen, and Jimmie R. Aker, both of Houston, Tex., assignors to Roy H. Cullen, Houston, Tex.

Division of Ser. No. 448,975, March 7, 1975, Pat. No. 3,926,269. This application Dec. 5, 1975, Ser. No. 638,078

Int. Cl.² E21B *3/10*

U.S. Cl. 175—65 **12 Claims**

1. A method of earth boring with a rotating drill bit driven by an electric motor power means and mounted with a drilling string of desired length formed by a plurality of connected tubular pipe joints having communicating bores which enables communication of the drill bit with a supply of drilling fluid, including the steps of:

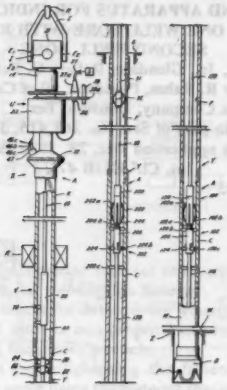
assembling the drill bit with the electric motor power means to form a unit to effect earth formation penetrating rotation with the drill bit when the electric motor power means is operated;

mounting the drill bit and electric motor power means unit with the tubular drilling string having a bore extending therethrough;

installing electrical power conductor means having an electrical connector means in the bore of the drilling string to supply electrical power to the drill bit and electric motor power means unit;

installing actuating means in the bore for effecting connection of electrical connector means inside the bore of the drill string;

connecting the actuating means with a source of electrical power for supplying electrical power to the drill bit and electric motor power means unit to rotate the drill bit;



operating the actuating means to electrically contact electrical connector means for the actuating means with electrical connector means for the electrical power conductor means; and

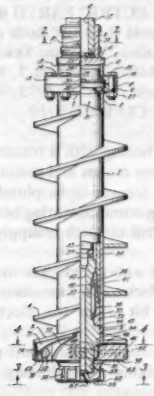
supply electrical power to the drill bit and electrical motor power means unit when desired to rotate the drill bit to effect earth formation penetrating rotation of the drill bit wherein earth boring is effected.

4,016,944

PNEUMATIC HAMMER-AUGER EARTH BORING APPARATUS

William I. Wohlfeld, San Angelo, Tex., assignor to Reed Tool Company, Houston, Tex.

Filed Jan. 12, 1976, Ser. No. 648,559
Int. Cl.² E21B *5/00*
U.S. Cl. 175—92 **10 Claims**



1. a percussion and rotary auger earth boring apparatus comprising:

a rotatable earth boring auger having a hollow case,

said auger case having a driven end, including means adapted for connection to an external rotary driving means, and a cutting end,

a first helical flight secured on said auger case extending helically from said cutting end substantially to said driven end,

a second helical flight secured on said auger case and extending at least partially from said cutting end towards said driven end at substantially the same pitch as said first flight,

said flights terminating at said cutting end in edges substantially aligned on opposite sides of said auger case,

a pneumatic percussor positioned removably within said auger case,

said percussor having a case enclosing a reciprocally movable pneumatically actuated hammer operable to strike an anvil member positioned therein for longitudinal movement,

said anvil member having a stem portion extending outside the cutting end of said auger case,

a rigid rock cutting bit member secured on said stem portion and extending across the entire diameter of said flights and movable therewith and having an upper surface directing cuttings on to said flights, and

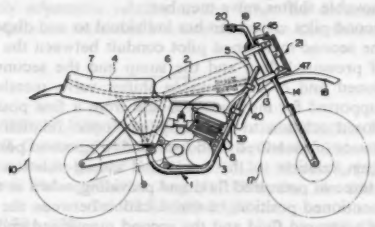
means secured at the cutting end edges of said flights and operatively engaging said bit member whereby rotation of said auger effects rotation of said bit member while said hammer effects percussive movement thereof.

4,016,945

MOTORCYCLE WITH A WATER COOLED ENGINE

Hirotaka Shibata, Hamamatsu, Japan, assignor to Yamaha, Hatsudoki Kabushiki Kaisha, Iwata, Japan

Filed Mar. 3, 1976, Ser. No. 663,441
Claims priority, application Japan, Mar. 6, 1975, 50-27296
Int. Cl.² B60K *11/04*; B62K *11/00*
U.S. Cl. 180—33 R **6 Claims**



1. A motorcycle with a water cooled engine comprising a frame having a head pipe at one end, a water cooled engine fitted to said frame, a steering shaft rotatably inserted through said head pipe, a control handle and a front fork for supporting a front wheel of said motorcycle, fixed to said steering shaft, a radiator fitted to said front fork, a flow-in side liquid chamber and flow-out side liquid chamber defined by the inner periphery of said head pipe and the outer periphery of said steering shaft separately from each other, a flow-in side liquid passageway and flow-out side liquid passageway formed in said steering shaft separately from each other, a pair of communication bores formed in said steering shaft respectively communicating between said flow-in side liquid chamber and flow-in side liquid passageway and between said flow-out side liquid chamber and flow-out side liquid passageway, first and second tubes connecting said liquid chambers to said water cooled engine, respectively, and third and fourth tubes connecting both said liquid passageways to said radiator, respectively, whereby cooling water within said radiator circulates to pass through said fourth tube, flow-out liquid passageway, flow-out side liquid chamber, second tube, water-cooled

engine, first tube, flow-in side liquid chamber, flow-in side liquid passageway and third tube to return to said radiator.

4,016,946

METHOD AND DEVICE FOR DRIVING THE DRIVING WHEELS OF A VEHICLE

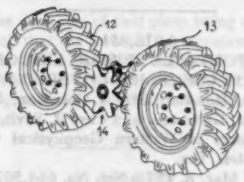
Jacques A. Demichelis, Paris, France, assignor to FORATRAC "Societe Civile", Paris, France

Filed Oct. 17, 1975, Ser. No. 623,222

Claims priority, application France, Oct. 17, 1974, 74.34957

Int. Cl. B60k *23/00*

U.S. Cl. 180—74 **6 Claims**



1. In an apparatus for driving the driving wheels of a vehicle through the intermediary of a tubular driving roller maintained between two driving wheels and meshing with the sculptures of the pneumatic tires of said wheels, the improvement comprising: at least one first bar-shaped member of said roller penetrating into one sculpture of a first tire and a second bar-shaped member penetrating into one sculpture of a second tire, at least one star-shaped flange coupled to one end of said roller, said bars being attached at least by one of their ends to the tips of the arms of said star-shaped flange and means disposed on said roller to couple the other ends of said bars to the roller at an angle oblique to the driving axis of said roller.

4,016,947

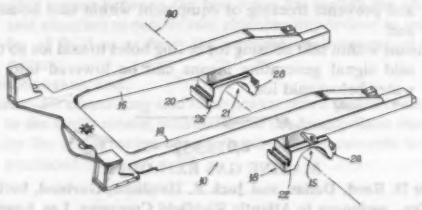
MEANS FOR SECURING AXLE TO FRAME

Richard W. Chamberlain, Aurora, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Dec. 1, 1975, Ser. No. 636,503

Int. Cl.² B60B *35/00*

U.S. Cl. 180—88 **9 Claims**



1. Apparatus for securing an axle housing relative to a frame, comprising:

a bracket fixed relative to the frame;

said axle housing defining first and second extended portions, positioned on either side thereof and engageable with first and second extensions of the bracket respectively;

clamp means for engaging and securing the first extension and first extended portion together; and

means for engaging and securing the second extension and second extended portion together.

4,016,948

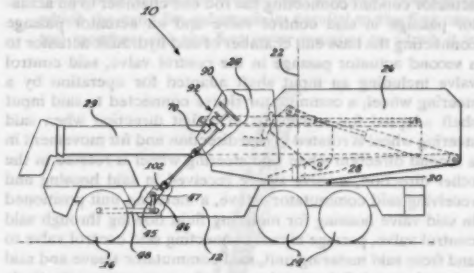
DUAL STEERING SYSTEM FOR VEHICLE

Donald A. Kuester, Wausau, Wis., assignor to J. I. Case Company, Racine, Wis.

Filed Nov. 17, 1975, Ser. No. 632,515

Int. Cl.² B62D *5/08*

U.S. Cl. 180—132 **3 Claims**



1. A vehicle having a vehicle chassis supported by a pair of steerable front wheels and at least one pair of rear wheels with said front wheels supported for movement about vertical axes to steer said vehicle, a cab rotated about a vertical axis on said chassis, and a dual steering system for said vehicle, said dual steering system including a hydrostatic steering system, a mechanical actuated power steering system and a steering wheel in said cab common to both said systems; said hydrostatic steering system including a hydrostatic steering valve in said cab, a pressurized fluid source and a reservoir connected to said valve, a fluid ram having one element connected to said chassis and a second element connected to said front wheels, and conduit means connecting said valve to said fluid ram; said mechanical actuated power steering system including a steering gear secured to said chassis and having an input shaft and an output shaft, linkage means connecting said output shaft to said front wheels, a disconnectable linkage system extending from said input shaft to said cab adjacent said steering wheel; and a selector unit in said cab adjacent said steering wheel for selectively connecting said steering wheel to said steering valve or said linkage system so that said vehicle may be steered by either said hydrostatic steering system or said mechanical actuated power steering system.

4,016,949

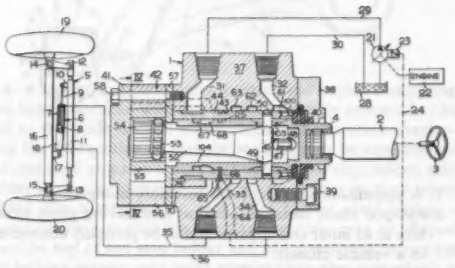
HYDROSTATIC LOAD SENSITIVE REGENERATIVE STEERING SYSTEM

John R. Plate, and Charles P. Heisig, both of Milwaukee, Wis., assignors to Allis-Chalmers Corporation, Milwaukee, Wis.

Filed Nov. 24, 1975, Ser. No. 634,892

Int. Cl.² B62D *5/06*

U.S. Cl. 180—160 **10 Claims**



1. A regenerative hydraulic steering system for a motor vehicle comprising, a variable displacement pump having a pressure compensator for controlling the displacement of the pump responsive to a sensed load pressure, a control valve

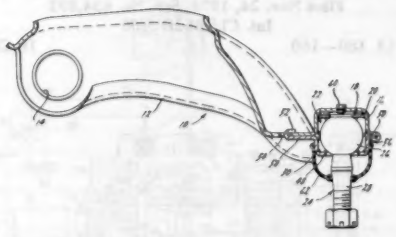
including a housing defining inlet passage for connection to the pump, a return passage for connection to a reservoir, and actuator passages, a hydraulic actuator for connection to a steering linkage to steer a motor vehicle, said hydraulic actuator including a piston with a rod connected to said piston extending from said hydraulic actuator defining a rod end hydraulic chamber and a base end hydraulic chamber, an actuator conduit connecting the rod end chamber to an actuator passage in said control valve and an actuator passage connecting the base end chamber of said hydraulic actuator to a second actuator passage in the control valve, said control valve including an input shaft adapted for operation by a steering wheel, a commutator sleeve connected to said input shaft adapted for movement in a first direction when said steering wheel is rotated in one direction and for movement in a second direction when said steering wheel is rotated in the other direction, a valve sleeve received in said housing and receiving said commutator sleeve, a metering unit positioned in said valve housing for metering fluid flowing through said control valve, passage means connecting said control valve to and from said metering unit, said commutator sleeve and said valve sleeve defining a plurality of passageways selectively connecting said inlet passage through said metering unit to said actuator passages for regenerative operation and connecting said inlet passage to one of said actuator passages through the metering unit and connecting the other actuating passage to the return passage for non-regenerative operation, said input shaft causing displacement of said commutator sleeve relative to said valve sleeve when said input shaft is rotated in either of said two directions, said displacement between said sleeves selectively connecting said passageways in said commutator sleeve and valve sleeve in said control valve for selective connection of said valve through said metering unit to said hydraulic actuator to selectively extend and contract said hydraulic actuator for steering of the motor vehicle, said commutator sleeve and valve sleeve defining a sensing passage in communication with said passageways for sensing a pressure signal when said variable displacement pump is connected to said hydraulic actuator through said control valve, a pilot line connecting said sensing passage in said control valve to said compensator for selectively sensing load pressures in said control valve to vary the displacement of the pump in response to the sensed pressure.

4,016,950

SUSPENSION ARM AND JOINT ASSEMBLY

William D. Allison, Grosse Pointe Farms, Mich., assignor to Ford Motor Company, Dearborn, Mich.

Filed July 7, 1975, Ser. No. 593,809
Int. Cl.² B60G 7/00
U.S. Cl. 280—674 **10 Claims**



1. A suspension arm and joint assembly comprising:

a stamped sheet metal suspension arm having pivot structure at its inner end constructed to be pivotally connected to a vehicle chassis;

said suspension arm having an integral first socket part spaced from said pivot structure;

a first bearing means positioned in said first socket part;

said first bearing means having a plurality of circumferentially spaced apart bearing elements;

a ball stud having a ball portion in slidable engagement with said circumferentially spaced apart bearing elements of said first bearing means and a shank portion extending in a direction away from said first socket part;

a second bearing means having a plurality of circumferentially spaced apart bearing elements in slidable engagement with said ball;

said first bearing means being disposed on one side of the equator of said ball portion and said second bearing means being disposed on the other side of the equator of said ball portion;

a second socket part engaging said second bearing means;

means securing said socket part to said suspension arm;

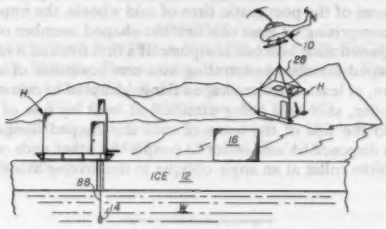
said first and second socket parts cooperating to provide an enclosure for said first and second bearing means and said ball portion of said ball stud.

4,016,951

AIR TRANSPORTABLE SEISMIC EXPLORATION SYSTEM FOR USE ON ICE-COVERED WATERS

Charles W. Dick, Houston; Otis A. Johnston, League City; John L. Paitson, Galveston, and Carl H. Savit, Houston, all of Tex., assignors to Western Geophysical Company of America, Houston, Tex.

Filed Mar. 8, 1976, Ser. No. 664,502
Int. Cl.² G01V 1/02
U.S. Cl. 181—109 **18 Claims**



1. A seismic exploration apparatus for use on ice-covered water, comprising:

a housing, said housing being substantially enclosed, said housing having a floor with a hole therein;

means for generating acoustic signals; power means located within said housing for supplying power to said generating means, said power means also creating heat, whereby said heat warms the air within said housing, provides suitable working temperatures for personnel within said housing and prevents freezing of equipment within said housing; and

means within said housing for boring holes in said ice so that said signal generating means can be lowered into the water below said ice.

4,016,952

MARINE GAS EXPLODER

Dale H. Reed, Dallas, and Jack E. Hardison, Garland, both of Tex., assignors to Atlantic Richfield Company, Los Angeles, Calif.

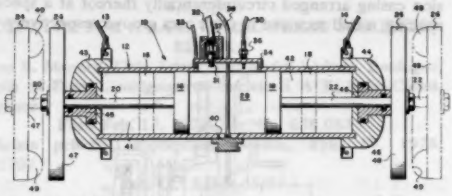
Filed Oct. 6, 1975, Ser. No. 619,927
Int. Cl.² G01V 1/38; H04B 13/00; G01V 1/02
U.S. Cl. 181—118 **8 Claims**

1. In a marine gas exploder utilizing an enclosed cylinder adapted to be supported in a submerged state, a piston movable therein, a piston rod extending from said piston through one end of said cylinder, and air spring means between said piston and said one end for biasing said piston away from said one end, the combination comprising:

a. an annular plate mounted at the external end of said rod substantially surrounded by water, one surface of said

plate being in facing relation to said one end, and unopposed by any other adjacent or contiguous surface of similar contour and extent; and

b. means for explosively driving said piston in the direction of said one end to propel said annular plate through the



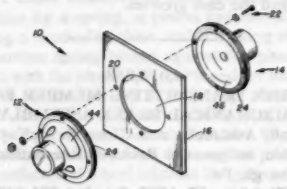
water, the diameter of said plate being selected between limits such that the forward acceleration thereof is sufficient to induce substantial cavitation adjacent its trailing surface and the damped return thereof responsive to said air spring means is insufficient to produce substantial oscillation.

4,016,953

PUSH-PULL TRANSDUCER SYSTEM

Robert J. Butler, 11605 Terry Town Drive, Reisterstown, Md. 21136

Filed May 23, 1975, Ser. No. 580,250
Int. Cl.² H05K 5/00; H04R 13/02
U.S. Cl. 181—144 6 Claims



1. A push-pull transducer system for reproduction of high fidelity sound, comprising:

two loudspeaker means each including a cone and a drive means, the loudspeaker means being coaxially disposed relative to each other with the base of each cone of each said means being disposed in facing relation to the base of the other of the cones to define a chamber therebetween;

sealing means between the two cones for sealing the aforesaid chamber to render said chamber impervious to transfer of fluid to or from the ambient environment of the system;

audio means; and,

means for connecting said loudspeaker drive means in series to the audio means, stimulation of the loudspeaker means by the audio means causing push-pull air currents to be produced.

4,016,954

FOLDABLE LADDER

Ronald Price Hickman, Waltham Abbey, England, assignor to Inventec International Limited, Sark, Guernsey (Channel Is.)

Filed Mar. 13, 1975, Ser. No. 558,120
Claims priority, application United Kingdom, Mar. 14, 1974, 11457/74; Apr. 11, 1974, 16263/74
Int. Cl.² E06C 1/383
U.S. Cl. 182—22 42 Claims

1. A foldable ladder having first and second sections, said first section comprising, in combination:

a first central elongate member and two first outer elongate members arranged one on each side of, and substantially parallel to, the central member; a series of first rungs each foldably connected to the central member and one of the outer members, each first rung being arranged to fold between an erected position, in which it extends generally at right angles to the longitudinal direction of each member to which it is connected, and a storage position in which the rung lies substantially parallel to the first central member with the first outer member to which it is

connected extending parallel to and in close juxtaposition with the first central member; and first engaging means, disposed on said first central member adjacent its upper end;

said second section comprising a second central elongate member and second engaging means, disposed on said second central member,

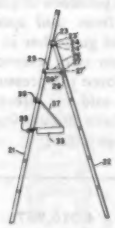
wherein said first and said second engaging means are operative to engage each other with said second central member adjacent, and subsantially parallel to said first central member at an exended partially overlapping position.

4,016,955

STEP LADDER WITH PAINT CARRIER APPARATUS

Robert B. Gates, R.R. No. 2, Mohall, N. Dak. 58761

Filed Mar. 25, 1976, Ser. No. 670,131
Int. Cl.² E06C 7/14
U.S. Cl. 182—122 1 Claim



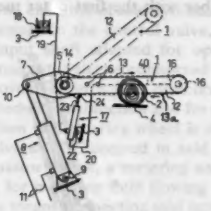
1. A ladder and paint carrier plate, said ladder comprising two ladder sections with one section pivotally mounted at its end to the other section and with the other section overlapping the first section so that the sections may be straightened out and used as a step ladder or folded into a step ladder, said ladder having locking means to lock the ladder sections when folded into a step ladder, said paint carrier plate having a center opening so that the paint carrier plate may be slipped over the top of the step ladder and slid downward to rest on the locking means, said paint carrier plate also comprising a pair of hooks pivotally mounted to the paint carrier plate and a pair of hooks fixed to the paint carrier plate, with the hooks being attachable to the rungs of the ladder to attach the paint carrier plate at different heights on the rungs of the ladder.

4,016,956

APPARATUS FOR LUBRICATING SAW CHAINS IN GUIDE BARS

Börje E. Karlsson, Rottne, Sweden (360 30)

Filed Oct. 10, 1975, Ser. No. 621,363
Int. Cl.² F16N 7/24
U.S. Cl. 184—15 R 12 Claims



1. Apparatus for lubricating a saw chain travelling on guide rail means carried by a guide bar, wherein said guide bar is mounted on a frame and is adapted to be rotated by power unit means in one direction to crosscut an object, afterwhich it is rotated back in the opposite direction, and wherein lubricant is conducted from a reservoir means to the saw chain through conduit means by the action of a lubricant pump, said apparatus comprising: a lubricant pump having a pump housing including a space therewithin into which lubricant is drawn from said reservoir means and from which it is transmitted to said saw chain, and a piston reciprocally mounted within said space, said lubricant pump being connected to said frame and said guide bar in such a way that the piston is moved upon rotation of the guide bar in said one direction to establish pressure within said space to force lubricant therefrom to said saw chain, and upon rotation of said guide bar in the opposite direction to establish suction in said space for drawing lubricant from said reservoir means; first conduit means connecting said pump housing space with said reservoir means; a suction valve connected in said first conduit means, arranged to be opened by suction in said space whereby to draw lubricant into said space from said reservoir means, and to be closed in the presence of pressure within said space; second conduit means connecting said pump housing space with said saw chain; and a pressure valve connected in said second conduit means, arranged to be closed by suction in said space, and to be opened in the presence of pressure within said space to transmit lubricant from said space to said saw chain, whereby rotation of said guide bar in said opposite direction will draw lubricant from said reservoir means through said suction valve and will force the pressure valve shut, and rotation of said guide bar in said one direction thereafter will close the suction valve and force the lubricant through said second conduit means to the saw chain.

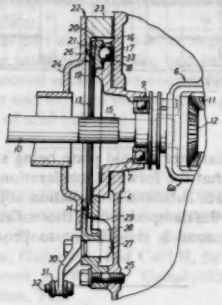
4,016,957

BALL-RAMP CAM ACTUATED DISK BRAKE

Masahide Osujo; Seiiti Ikegami; Yoshinobu Murayama; Takaho Omura, and Tadashi Morimoto, all of Sakai, Japan, assignors to Kubota Tekko Co., Ltd., Osaka, Japan

Filed Sept. 30, 1975, Ser. No. 618,154
Claims priority, application Japan, Aug. 20, 1974, 49-95784; Oct. 24, 1974, 49-129730; Nov. 22, 1974, 49-134718
Int. Cl.² F16D 55/31
U.S. Cl. 188—72.7 4 Claims

1. A disk brake apparatus for use in a tractor or the like comprising a brake disk mounted on each of a pair of differential gear shafts extending through differential bearing cases fixed to the opposite side walls of a transmission case respectively to rotatably support a differential case, a brake housing mounted on each of the opposite side walls of the transmission case and having a friction surface outside the brake disk and in facing relation thereto, and thrust producing means disposed in the housing to press the brake disk against the friction surface, the thrust producing means comprising a cam plate formed with cam grooves facing a wall of said transmission casing arranged circumferentially thereof at a specified spacing, a ball received in each cam groove respectively, and



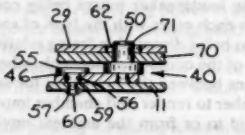
a ball retaining plate having bores for retaining each said ball therein respectively, the balls being held in the bores in point-to-point contact with the side wall of the transmission case or a seat member placed in each of the bores of the ball retaining plate, the cam plate being movable in its circumferential direction to produce a thrust in the direction to press the brake disk against the friction surface through the cooperation of the balls and the cam grooves.

4,016,958

MOTION TRANSMITTING MEMBER FOR A MECHANICAL BRAKE ASSEMBLY

Gene A. Yoak, Ashtabula, and Glenn E. McKay, Kingsville, both of Ohio, assignors to Rockwell International Corporation, Pittsburgh, Pa.

Filed May 27, 1975, Ser. No. 581,339
Int. Cl.² F16D 51/12
U.S. Cl. 188—78 1 Claim



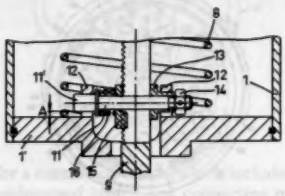
1. A brake assembly comprising a support, brake shoes carried by said support for outward displacement into frictional contact with a surrounding brake drum, an actuating lever disposed between said support and said brake shoes, and motion transmitting means mounted to said support, said motion transmitting means comprising a link mounted to said support intermediate said support and said actuating lever, an aperture adjacent each end of said link, means cooperating with one of said apertures to pivotally mount said link to said support, a pin non-rotatably mounted in the other said apertures, said pin including a radially extending flange intermediate oppositely disposed ends thereof with one surface of said flange abutting a major surface of said link, one end of said pin upset interiorly of said other aperture to secure said pin to said link, the other surface of said flange is a bearing surface substantially coplanar with the surface of said lever facing said support, said one surface of said flange extending radially outward a distance greater than one-half the diameter of said one end of said pin and the other end of said pin projecting

away from said support between said actuating lever and one of said brake shoes whereby said pin will move said brake shoe radially outward in response to movement of said actuating lever.

4,016,959
ACTUATOR FOR A RAIL WHEEL TREAD SCRUBBER BLOCK

Pierre R. Menard, l'Isle Adam, and André Ledoux, Boulogne, both of France, assignors to Societe S A B, Saint-Cloud, France

Filed Feb. 13, 1976, Ser. No. 658,083
Claims priority, application Sweden, Feb. 17, 1975, 7501707
Int. Cl.² F16D 65/54
U.S. Cl. 188—196 B **2 Claims**

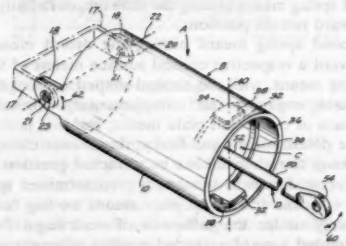


1. A fluid pressure controlled cylinder-piston unit for actuating a wheel contacting surface toward a rail wheel, comprising in combination, a cylinder, a piston movable forward in said cylinder under influence of fluid pressure and held in a return position by a spring, a piston rod movable with said piston having a toothed surface, and a locking element comprising a member spring biased against the piston rod teeth and movable with the piston rod positioned for locked engagement with the toothed surface to follow the piston rod during a forward stroke toward said wheel and to lock the piston rod relative to the cylinder on the return stroke after movement over a predetermined clearance distance between said wheel contacting surface and wheel wherein the piston rod defines a longitudinal slot and said locking element comprises a pin extending through said rod, whereby movement in said slot comprises said predetermined clearance distance.

4,016,960
DASHPOT WITH GUIDED PISTON

Lance C. Wilcox, Wilton, Conn., assignor to Airpot Corporation, Norwalk, Conn.

Filed Jan. 2, 1976, Ser. No. 645,942
Int. Cl.² F16F 9/02
U.S. Cl. 188—282 **14 Claims**

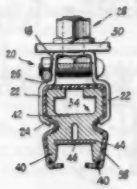


1. A dashpot comprising
A. a hollow cylinder substantially closed at one end thereof;
B. piston means comprising
i. a piston disposed in and slidable along said cylinder, said piston having an outer sidewall spaced inwardly from the inner sidewall of said cylinder;
ii. fluid blocking means secured to said piston for movement therewith and having a flexible portion thereof disposed intermediate opposed sidewall portions of said piston and said cylinder respectively and effective to block passage of fluid therebetween; said piston and said fluid blocking means as a unit by themselves being configured and dimensioned for appreciable pivotal movement within said cylinder about axes transverse to said cylinder axis; and
iii. at least one pair of guide means disposed on said piston for movement therewith, each guide means of said guide pair having an outer surface closely adjacent said cylinder inner sidewall, substantially circumferentially spaced from the outer surface of the other guide means of said guide pair, and configured and dimensioned to essentially preclude movement of a first magnitude of said piston means within said cylinder along a first axis substantially connecting said guide means of said guide pair while only limiting to a predetermined level movement of a second magnitude appreciably greater than said first magnitude of said piston means within said cylinder about a second axis parallel to said first axis; and
C. a piston rod having a first end portion operatively connected to said piston for moving said piston and a second end portion adapted for connection with a member undergoing reciprocating motion along a path substantially, but not necessarily exactly, aligned with the axis of said cylinder;
whereby said guide pair insures the effective blocking function of said blocking means by essentially precluding motion of said piston means within said cylinder along said first axis while limiting to an acceptable level motion of said piston means within said cylinder about said second axis in response to limited misalignment of the axis of said cylinder and the axis of said piston rod.

4,016,961
RAIL CONSTRUCTION FOR RAIL-TYPE ELECTRIFICATION SYSTEMS

Alleyne C. Howell, Jr., 645 Mine Hill Road, Fairfield, Conn. 06430

Division of Ser. No. 603,149, Aug. 8, 1975, Pat. No. 3,998,306.
This application Aug. 2, 1976, Ser. No. 710,906
Int. Cl.² B60M 1/34
U.S. Cl. 191—23 A **5 Claims**



1. A rail construction for rail-type electrification systems, comprising in combination:
a. an elongate malleable metal electrically conducting carrier rail member or relatively high expansion coefficient, formed of extruded stock, said member having a pair of spaced flange portions and a web portion connecting said flange portions,
b. said flange portions having undercuts in their inner surfaces adjacent the connecting web portion,
c. an elongate, substantially flat contact member of metal having a hard, glass-like surface, said contact member being coextensive with said rail member, said contact member having a relatively low expansion coefficient and

having the property of resisting pitting and having broad oppositely disposed plane surfaces and oppositely disposed parallel edge portions extending into said undercuts, said edge portions and plane surfaces thereof being permanently pinched by the walls of the undercuts as a consequence of the flange portions being inwardly forced beyond the elastic limit of the stock, toward one another from divergent positions with the contact member so positioned,

d. one broad surface of said contact member facing and being juxtaposed to said web portion,

e. said web portion having a cross-sectional enabling it to be permanently reshaped when the flange portions are forced inwardly, said web portion at all locations between the flange portions, and said flange portions being under continual tensile stress to effect the pinching of the contact member,

f. said pinching effecting a permanent and rigid mechanical connection between the conducting carrier rail member and the contact member so as to resist relative movement between the two parts at any given temperature,

g. said permanent reshaping of the web portion being maintained regardless of normal environmental temperature changes by virtue of the higher expansion coefficient of the carrier member as compared with the contact member,

h. the said different expansion coefficients preventing distortion and permanent deformation of the carrier member as the environmental temperature increases,

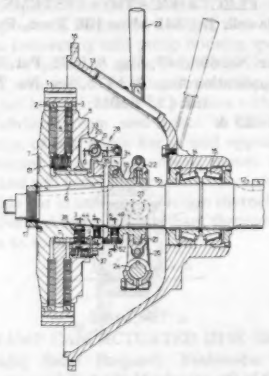
i. changes in temperature of the rail construction effecting a relative longitudinal displacement of portions of the carrier and contact members.

4,016,962

VIBRATION RESISTANT MECHANICAL CLUTCH

James B. Black, Roscoe, Ill., assignor to Twin Disc, Incorporated, Racine, Wis.

Filed Nov. 3, 1975, Ser. No. 628,389
Int. Cl.² F16D *13/56, 49/00;* **F16F** *13/02*
U.S. Cl. 192—70.2 **6 Claims**



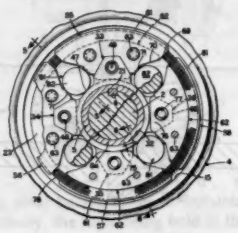
1. In a friction plate clutch the combination of a rotatable torque transmitting drum element, a torque transmitting shaft element extending axially of said drum element in rotatable relation thereto; a back plate non-rotatably secured to said shaft element in an axially fixed position and having an externally splined hub; a pressure plate loosely spline connected with said hub in axially slideable and radially loose relation thereto; a stack of interleaved driving and driven clutch plates operatively interposed between said drum and shaft elements; and articulated link mechanism pivotally connected to said pressure plate and operable to shift said pressure plate toward said back plate; and spring means biasing said pressure plate into a radially fixed relation to said hub, said spring means comprising a coil spring seated in a radial bore of said hub and bearing against said shaft element and also bearing radially outward upon said pressure plate.

4,016,963

CENTRIFUGAL CLUTCH CONSTRUCTION

Richard C. St. John, North Canton, Ohio, assignor to Aspro, Incorporated, Westport, Conn.

Filed Feb. 9, 1976, Ser. No. 656,378
Int. Cl.² F16D *43/14*
U.S. Cl. 192—105 BA **13 Claims**



1. Centrifugal clutch construction including:

a. a driven clutch member having an axially extending coupling surface;

b. drive shaft means;

c. rotor means mounted on the drive shaft means for rotation with the shaft means, said rotor means being formed with a plurality of radially extending slots;

d. a plurality of shoe means mounted on the rotor means and movable radially between retracted and extended positions;

e. the shoe means each having an outer frictional coupling surface adapted to drivingly engage the axially extending coupling surface of the driven clutch member when the shoe means are in extended position;

f. detent plate means formed on each of the shoe means and extending radially inwardly toward the drive shaft means and located within a respective rotor means slot;

g. inwardly tapered conical surface means formed on each of the detent plate means, said surface means being located within the rotor means slots when the shoe means are in retracted positions;

h. a plurality of detent means mounted on the rotor means and movable axially into respective slots of the rotor means, said detent means being formed with generally conical-shaped outer ends complementary to the conical surface means of the detent plate means;

i. first spring means biasing the shoe means radially inwardly toward retract position;

j. second spring means biasing the detent means axially toward a respective conical surface means of the detent plate means, with the conical-shaped ends of the detent means engaging the complementary conical surface means of the detent plate means; and

k. the detent means and first spring means clampingly retaining the shoe means in retracted position until the drive shaft means reaches a predetermined speed, said shoe means and detent plate means moving radially outwardly under the influence of centrifugal force from retracted toward extended position disengaging the detent means conical-shaped ends from engagement with the detent plate conical surface means, whereupon the clutch shoe means snap outwardly from retracted to extended position and drivingly engage the driven clutch member.

4,016,964

ROTOR FOR CENTRIFUGAL CLUTCH

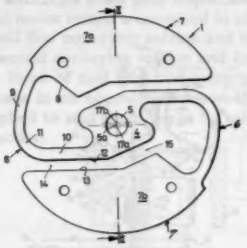
Günter Dietzsch, Schmiden; Gerd Frers, Weinstadt; Klaus Henning, Stuttgart, and Helmut Lux, Waiblingen, all of Germany, assignors to Andreas Stihl Maschinenfabrik, Neustadt, Germany

Filed Mar. 3, 1976, Ser. No. 663,293

Claims priority, application Germany, Mar. 5, 1975, 7506785[U]

Int. Cl.² F16D *43/06*

U.S. Cl. 192—105 CD 19 Claims



1. A rotor for a centrifugal clutch, which includes a plurality of axially superimposed layers, and connecting means interconnecting said layers to form said rotor as a multi-layer packet, said rotor comprising a central supporting element, at least two arcuate segmental centrifugal weights, and elastic supporting members respectively connecting one end portion of said centrifugal weights with said central supporting element.

4,016,965

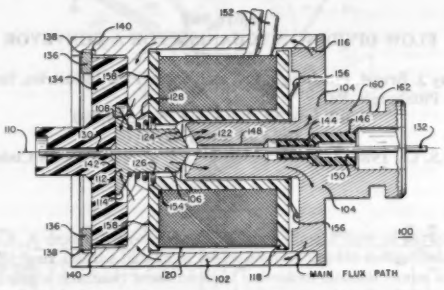
MATRIX PRINT HEAD AND SOLENOID DRIVER

Robert L. Wirth, and David W. Bell, both of Ithaca, N.Y., assignors to NCR Corporation, Dayton, Ohio

Filed Aug. 19, 1975, Ser. No. 605,970

Int. Cl.² B41J *3/04*

U.S. Cl. 197—1 R 24 Claims



1. A magnetic circuit comprising:

a coil for providing magnetic flux when energized by an electrical current;

flux conductive means for providing a substantially continuous non-restricted path for said flux comprising a housing having a stationary core member enclosing one end thereof and an annular pole piece substantially closing the other end thereof and a plunger reciprocally movable in one direction with respect to said core member, said plunger having a flanged end including an inner conical surface aligned with a companion outer surface of said pole piece and an opposite end including a conical surface aligned with a companion conical surface of said core member; and

plunger return means yieldingly urging said plunger to a normal position defining a first and a second low reluctance air gap between said plunger conical surfaces and said companion pole piece and core member conical surfaces for generating upon energization of said coil a composite accelerating magnetic force on said plunger in part by each of said air gaps.

4,016,966

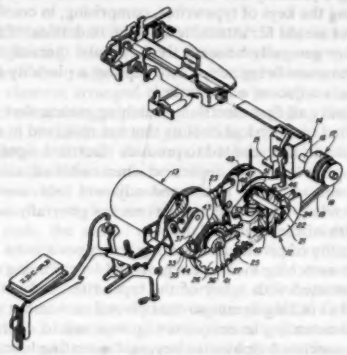
TYPEWRITER JAM RELEASE MECHANISM

Theodore N. Madison, Windsor, Conn., assignor to Royal Business Machines, Inc., Hartford, Conn.

Continuation of Ser. No. 542,243, Jan. 20, 1975, abandoned, which is a division of Ser. No. 333,389, Feb. 16, 1973, Pat. No. 3,876,054. This application Mar. 24, 1976, Ser. No. 670,097

Int. Cl.² B41J *23/02*

U.S. Cl. 197—16 1 Claim



1. In an electric typewriter having a frame mounting a power roll, a power train for continuously rotating said power roll, and a motor having an output shaft for driving said power train which motor is subject to stalling incident to overload demands on said power roll, and a normally engaged wrap spring clutch between said motor shaft and a pulley in said power train,

manually operated means for momentarily disengaging said clutch to allow said motor to resume speed and deliver a power surge to said power roll on reengagement of said clutch,

said means including a friction band trained around both a frame-fixed part and a driven part of said clutch,

means resiliently connecting one end of said band to said frame,

a lever pivoted at one end on said frame,

means connecting the other end of said band to the other end of said lever,

operator controlled means for moving said lever about its pivot to tension said band on said clutch part to frictionally rotate said clutch part to unwind said wrap spring clutch to allow said motor to resume speed, said operator controlled means including

a pivotally mounted segment-shaped member,

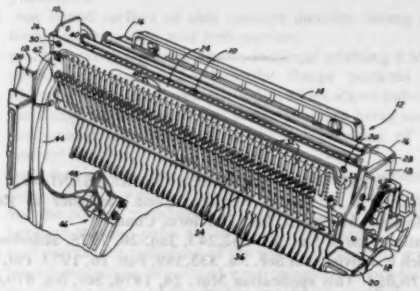
a link connected to lever and eccentrically mounted on said segment-shaped member, and

means for restoring said segment-shaped member after rotation and release thereof by an operator to allow said clutch to reengage.

4,016,967
DECODING MEANS WITH ERROR INHIBITOR FOR USE WITH A TYPEWRITER

William E. Webb, Hoffman Estates, Ill., assignor to Hamilton Communications, Inc., Schaumburg, Ill.

Filed Nov. 18, 1975, Ser. No. 632,924
Int. Cl.² B41J 5/08
U.S. Cl. 197—19 9 Claims



1. Apparatus for attachment to a typewriter for selectively actuating a plurality of electrical switch means in response to depressing the keys of typewriter, comprising, in combination:

support means for attachment to the underside of the typewriter generally beneath the keyboard thereof, said support means being adapted to support a plurality of switch means adjacent one another;

a plurality of first electrical switching means that are connected in electrical circuits that are matrixed in rows and columns, and adapted to produce electrical signals identifying the key being depressed when switched, said switching means being positioned adjacent one another and extending along said support means generally across the width of the keyboard;

a plurality of pivotable actuating levers positioned adjacent said switching means, each of said levers being operably associated with a key of the typewriter and with one of said switching means so that pivotal movement of one of said actuating levers occurs in response to depression of its associated typewriter key, said actuating levers actuating its associated switching means;

means operably associated with the universal bar mechanism of the typewriter, said means being movable in response to the universal bar triggering the escapement mechanism of the typewriter;

second switching means being operated by said universal bar mechanism associated means;

circuit means associated with said second switching means and said first switching means adapted to inhibit the receipt of said electrical signals by said matrixed electrical circuits from said first switching means until said second switching means is actuated, said signals thereby being inhibited unless and until a character is typed.

4,016,968
METHOD AND APPARATUS FOR ORIENTING CAN ENDS

Ronald B. Stelter, Country Club Hills, Ill., assignor to The Continental Group, Inc., New York, N.Y.

Filed Sept. 5, 1975, Ser. No. 610,900
Int. Cl.² B65G 47/24
U.S. Cl. 198—394 5 Claims

1. In a mechanism for orienting a substantially planar article to a predetermined angular position said article having stop means formed thereon, comprising:

a sensor mateable with said stop means;

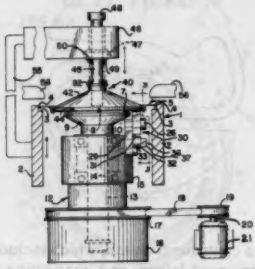
a rotating drive means;

means for depositing said article upon said drive means into contact with said sensor thereupon terminating rotation of said article, to hold the same in oriented position; and

said drive means including clutch means arranged to slip upon contact being made by the stop means and said sensor to prevent abrasion between the drive means and said article; and

said drive means including a vertically disposed mandrel rotatable on a generally vertical axis, a pad at the upper end of the mandrel for seating said article, and said sensor comprising a libratory element pivotally mounted on a substantially horizontal axis for vertical pivotal movement and having a stop projecting upwardly from said element and movable to the locus of said stop means into intercepting relation therewith; and

said libratory element having a lower edge and means engageable with said lower edge for limiting pivotal movement of the element in a direction biasing said stop upwardly; and



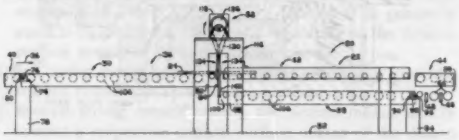
clamp means vertically aligned with the mandrel and having means biasing the same downwardly into a position clamping the article between the same and the mandrel; and

said means for depositing said article upon the drive means comprising reciprocating conveying means, and link means operatively connecting said clamp means with the conveying means for holding the article upon the mandrel when the article is placed thereon and releasing the article from the clamp means upon said conveying means initiating movement of the article to a succeeding station.

4,016,969
FLOW DIVIDING MECHANISM FOR A CONVEYOR SYSTEM

Jay J. Brand, Pittsburgh, Pa., assignor to PPG Industries, Inc., Pittsburgh, Pa.

Filed July 22, 1975, Ser. No. 598,090
Int. Cl.² B65G 47/30
U.S. Cl. 198—435 28 Claims



1. An article flow dividing mechanism, comprising:

a first conveying section having a first end and a second end;

means for pivotally mounting the first end of said first conveying section to move the second end of said first conveying section through a first reciprocating arcuate path;

a second conveying section having a first end and a second end;

means for pivotally mounting the first end of said second conveying section in spaced relation to the first end of said first conveying section to move the second end of said second conveying section through a second reciprocating arcuate path to align the second end of said first

conveying section and second end of said second conveying section at a predetermined position along their respective arcuate paths; and

elevator means comprising:

motor means;

shaft means operatively connected to said motor means; and

means operatively connected to said shaft means and said first and second conveying sections for simultaneously moving the second end of said first conveying section and the second end of said second conveying section in opposed directions along their respective arcuate paths when said motor means is energized to align the second end of said first conveying section and the second end of said second conveying section and for applying the dynamic force of said first conveying section to said shaft means in an opposed direction to the dynamic force applied to said shaft means by said second conveying section.

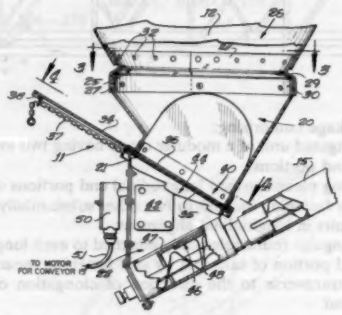
4,016,970
BULK BIN DISCHARGE CONTROL BOOT

John M. Wert, South Bend, Ind., assignor to Chore-Time Equipment, Inc., Milford, Ind.

Continuation of Ser. No. 361,506, May 18, 1973, abandoned. This application Nov. 26, 1975, Ser. No. 635,433

Int. Cl.² B65G 65/46

U.S. Cl. 198—524 11 Claims



1. A device for receiving and controlling a flow of particulate feed and the like from a bin, comprising bin collar means having a relatively small neck of unbroken circular shape and a relatively large exhaust of unbroken circular shape for receiving the feed flow and reducing the internal pressure of the feed flow, upper boot means for receiving the feed flow from the bin collar means, regulator means inclined upwardly in a given direction and attached to the upper boot means for selectively restricting the cross-sectional area of feed flow through a range of area sizes, lower boot means attached to the regulator means for receiving the feed flow having a lower boot exhaust inclined upwardly at an angle and an orientation opposite to that of the regulator means for introducing the feed flow to a feed conveyor means and switch means having a sensor means extending into the lower boot means between the regulator means and the conveyor means for halting operation of the conveyor means in response to the absence of feed flow, and thereby preventing unnecessary wear of the feed conveyor.

4,016,971
CONVEYOR FOR USE IN TOBACCO SHREDDING APPARATUS

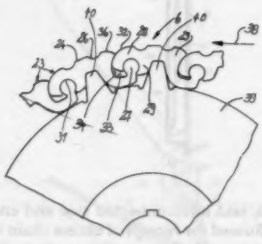
Werner Komossa, Bornsen; Werner Neustadt, and Gerhard Tolasch, both of Hamburg, all of Germany, assignors to Hauni-Werke Körber & Co., KG, Hamburg, Germany

Filed Feb. 27, 1975, Ser. No. 553,901

Claims priority, application Germany, Mar. 8, 1974, 2411117

Int. Cl.² B65G 15/30

U.S. Cl. 198—850 8 Claims



1. (REPLACES THE CLAIMS 10 AND 11) In a conveyor for compacting tobacco and for advancing compacted tobacco into the range of a comminuting device, an endless flexible element arranged to travel in a predetermined direction and comprising a plurality of interengaging neighboring links, each of said links having a leading end and a trailing end, as considered in said direction, a tobacco-contacting outer side, an inner side, a substantially cylindrical male coupling portion provided in said outer side at one of said ends and a complementary socket provided in said inner side at the other of said ends, the socket of each link receiving the coupling portion of the neighboring link and each coupling portion substantially filling and being turnable in the corresponding socket, each link further comprising a first protuberance adjacent to said socket and having a cylindrical first surface and each link also having a complementary second surface adjacent to said coupling portion, said first surface being in permanent sliding engagement with the second surface of the neighboring link to shield the coupling portion in the corresponding socket against entry of foreign matter and said coupling portion and first protuberance of each link extending transversely of said direction, each of said links further comprising a second protuberance and said socket being disposed between said first and second protuberance of the respective link, said first and second protuberance being disposed at said inner side and said inner side further having a tooth space between said second protuberance and said coupling portion of the respective link.

4,016,972
DISPLAY CONTAINER FOR NECK CHAINS AND THE LIKE

Edmund Szamborski, Scarsdale, N.Y., assignor to Edmund Szamborski, Scarsdale, N.Y.

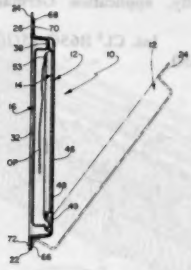
Filed Oct. 20, 1975, Ser. No. 624,176

Int. Cl.² B65D 75/32, 73/00

U.S. Cl. 206—45.34 15 Claims

1. A display container for chains such as necklaces comprising, an assembly consisting of separate base, platform and cover portions, said base comprising a bottom wall having a peripheral bottom edge with interconnected side and end walls extending upwardly therefrom and terminating in an upper peripheral edge, the inner surfaces of said side and end walls having an inwardly extending ledge upwardly spaced from said bottom wall and terminating short of said upper peripheral edge, said platform having an interior chain receiving channel disposed therein, an upstanding boss disposed

within said channel and a peripheral edge extending outwardly from said channel, said peripheral edge adapted to contact said base ledge to support said platform above and spaced from said bottom wall, said chain receiving channel having means for receiving a running length of chain, and wherein central cavity positioned beneath said platform and defined by



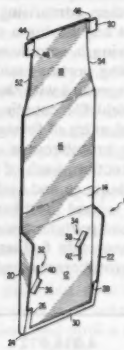
said bottom wall, said interconnected side and end walls and said platform is formed for receipt of excess chain when a loop thereof is placed in said chain receiving channel about said upstanding boss, said cover having a top and side walls downwardly extending therefrom and terminating in a lower peripheral edge, said cover adapted for receipt of said base when said container is in a closed position.

4,016,973

PLASTIC HOLDER FOR SAFETY MATCHES

Richard E. Blake, 3110 Frederick Ave., Colonial Heights, Va. 23834

Filed Oct. 6, 1975, Ser. No. 619,839
Int. Cl.² A24F *27/04*
U.S. Cl. 206—107 **8 Claims**



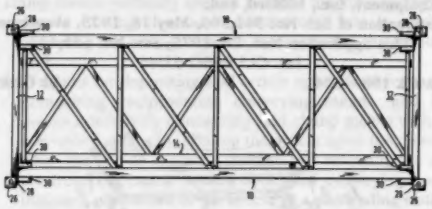
1. A plastic holder for receiving safety matches which comprises:
   a. a pouch to receive a pack of bookmatches, one portion of which constitutes a rear panel of said plastic holder,
   b. top, front and overlap panels of said plastic holder being foldable along fold lines between adjacent panels to a closed position in which said panels envelop said pack of bookmatches,
      1. said overlap panel overlapping at least a portion of said rear panel when said plastic holder is folded into its closed position,
      2. said overlap panel being provided with at least two spaced apart foldable locking tab means at one end thereof,
   c. and a spaced pair of locking tab-receiving means provided on said rear panel,
      1. said locking tab-receiving means including angularly positioned cut-out portions so spaced with respect to the spacing of said foldable locking tab means on said overlap panel that in order to insert said foldable locking tab means on said overlap panel into said locking tab-receiving means, said overlap panel must be squeezed and twisted; and in order to remove said locking tab means from said locking tab-receiving means, said overlap panel must be twisted and squeezed,
      2. each of said locking tab-receiving means in said rear panel constitutes first and second cut-out portions with said first cut-out portion thereof being wider than said second cut-out portion so as to readily receive and release a locking tab and with said second cut-out portion being narrower so as to lock said locking tabs in position.

4,016,974

PACKAGE FOR TRANSPORTING UNITS OF A MODULAR CRANE

Hans Tax, Potsdamer Str. 3, D-8 Munich 40, Germany

Filed Oct. 23, 1975, Ser. No. 625,307
Claims priority, application Germany, Nov. 8, 1974, 2453166
Int. Cl.² B65D *85/46, 85/68*
U.S. Cl. 206—321 **4 Claims**



1. A package comprising:
   a. an elongated unit of a modular crane having two longitudinal end portions;
   b. fastening means on said longitudinal end portions of said unit for fastening the unit to two other substantially identical units in longitudinal alignment;
   c. a rectangular frame releasably attached to each longitudinal end portion of said unit by said fastening means in a plane transverse to the direction of elongation of said unit; and
   d. coupling means on each of the four corners of each frame for coupling said frame to container handling apparatus.

4,016,975

NIPPLE CLOSURE FOR FLUID CONTAINER

Ilse M. Hammer, 46 Place Kieffer, Dollard des Ormeaux, Quebec, Canada

Filed Jan. 5, 1976, Ser. No. 646,440
Int. Cl.² B65D *33/14, 85/67*
U.S. Cl. 206—390 **13 Claims**

1. A nipple closure of flexible material for open ended fluid containers, said closure comprising a continuous side wall defining a nipple body having a nipple end and an opposed open end, a peripheral skirt portion defined by said side wall adjacent said open end for engagement about a rigid margin of an open end of said open ended fluid containers, said closure

being formed by a tubular body of flexible material collapsed to form opposed walls defining opposed parallel longitudinal

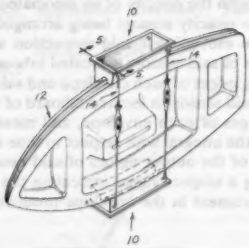
edges, and a nipple shaped seal line extending from between said longitudinal edges and defining said nipple end.

4,016,976

A SUPPORT FOR STORING AND SHIPPING SMALL BOATS

Dale L. Cosper, 1603 Hoover Ave., South Bend, Ind. 46615

Filed June 10, 1976, Ser. No. 694,561
Int. Cl.² B65D *85/68*
U.S. Cl. 206—335 **4 Claims**



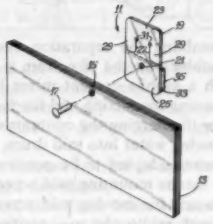
1. A support for a boat comprising first and second cradle means for positioning generally abeam said boat with said first cradle means at the port side and said second cradle means at the starboard side of the boat, ach cradle means including a base means for contact with the floor or ground and trough means for contacting said boat adjacent the gunwales thereof, and connector means extending between said means at the starboard side of the boat, each cradle means towards one another into compressive engagement with said boat.

4,016,977

ASSEMBLAGE WITH DUAL SUPPORT

Richard G. Krautsack, Arlington Heights, Ill., assignor to The Cooperative Marketing Co., Elk Grove Village, Ill.

Continuation-in-part of Ser. No. 559,167, March 17, 1975, Pat. No. 3,945,559. This application Dec. 15, 1975, Ser. No. 640,556
Int. Cl.² B65D *85/00*; G09F *1/00*
U.S. Cl. 206—526 **4 Claims**



1. An assemblage of items for presentation for taking on a one-by-one basis, which assemblage comprises

a plurality of generally sheetlike items,

means for supporting said items either from a price channel having top and bottom flanges or against the vertical surface of a wall or the like,

said support means including a flat support plate of flexible plastic material which includes a head section and a base section, said head section of said plate having a pair of ears formed therein, the lower edges of which ears are spaced from the upper edge of said head section a distance greater than the vertical distance between the top and bottom flanges of a price channel,

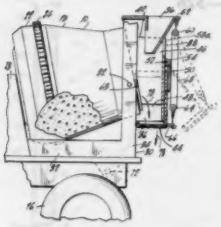
said plate having pressure-sensitive adhesive means on the rear surface of said base section and having a release liner covering said adhesive, and

pivot means linking said plurality of items and said plate, said pivot means being connected to a generally central location on said plate that is vertically aligned with the plate region lying between said ears, so that said plate can be pivoted 180° in the vertical plane of the flat plate from a first orientation, where said head section is uppermost and where after insertion of said upper edge of said head section into the top flange of a price channel said ears can be snapped into the bottom flange of the price channel to cause said ears to first take an outwardly arcuate configuration and after inward application of pressure to snap over-center to lock said ears within the channel and resist dislodgement to securely support said items in depending relation therebelow, to a second upsidedown orientation where said base section is uppermost and said adhesive can attach said plate to a vertical surface and can stably support said items in depending relation generally therebelow.

4,016,978
CEMENT MIXER APPARATUS

Frank Danna, Jr., 1 Munson St., Croton-on-Hudson, N.Y. 10520

Filed Aug. 25, 1975, Ser. No. 601,875
Int. Cl.² B07B 1/00
U.S. Cl. 209—2 6 Claims

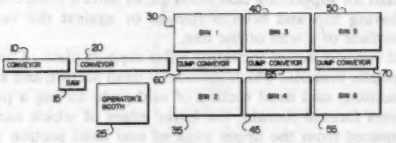


1. A device enabling the separation and reclamation of gravel, stones, pebbles or the like from a concrete mix in combination with a mobile cement mixer having a drum, a delivery outlet, means for mixing and for feeding mix to said delivery outlet for discharging the contents of said drum, and means for introducing water into said drum; said device comprising screen means adapted to be positioned in alignment with said outlet, means mounting said screen means on said cement mixer, means for moving said screen means from a position aligned with said outlet to a position displaced from said outlet, and means for securing said screen in aligned position with said outlet.

4,016,979
LOG SORTING CONVEYOR

David R. Bibler, Russellville, Ark., assignor to Bibler Brother, Inc., Russellville, Ark.

Filed Sept. 18, 1975, Ser. No. 614,657
Int. Cl.² B65G 21/00
U.S. Cl. 209—74 R 10 Claims



1. Apparatus for sorting logs to either side of a central transport path comprising:

conveyor means for transporting logs along said path, said conveyor means including a conveyor frame, an endless conveyor supported by said conveyor frame, drive means for driving said endless conveyor mounted on and below said conveyor frame and side members extending upward and outward from said endless conveyor to define a through preventing lateral displacement of logs being transported;

a support structure including means defining at least one central pivot point for connection to said conveyor frame, said pivot point being above the level of said drive means;

connecting means for connecting said conveyor means to said support structure at said pivot point, said connecting means including first pin means providing a pivot axis for said conveyor means;

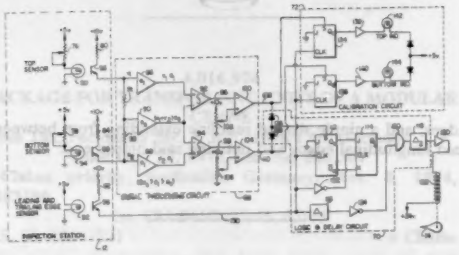
pneumatic cylinder means connected between said conveyor means and said support structure effective when actuated for selectively causing said conveyor means to pivot about said axis; and

control means operable to cause the elective actuation of said pneumatic cylinder means to cause said conveyor means to be pivoted sufficiently to cause a log carried by said conveyor means to roll out of said trough to a selected side, said drive means acting as a counterweight to then cause said conveyor means to be returned to an initial level orientation.

4,016,980
DEVICE FOR CHECKING ENVELOPES FOR ENCLOSED DOCUMENTS

John R. DeHart, Coral Gables, Fla., and Larry L. Nelson, Redwood City, Calif., assignors to Docutronix, Inc., Homestead, Fla.

Filed May 9, 1975, Ser. No. 576,104
Int. Cl.² B07C 5/10
U.S. Cl. 209—111.7 T 14 Claims



1. A device for checking a plurality of generally rectangular envelopes for enclosed documents, said device comprising means for feeding said envelopes one at a time past an inspection station at a substantially constant velocity with each of said envelopes being oriented so that two of its edges are leading and trailing edges, respectively, both perpendicular to its direction of movement and its remaining two edges are parallel to said direction of movement, and a detection means at said inspection station, said detection means comprising two sensors spaced from one another along a line generally parallel to the plane of said envelopes and perpendicular to said direction of envelope movement, said two sensors being opacity sensors each producing an electrical output signal which varies with the opacity of an associated discrete sensed field, said two opacity sensors being arranged so that as said envelopes are moved past said inspection station the field sensed by one of said sensors is located inboard of one of said two remaining edges of each envelope and said field sensed by the other of said sensors is located inboard of the other of said remaining edges of each envelope, and means responsive to variations of the integral with respect to time of the difference in the values of the output signals of said two opacity sensors for producing a suspect signal indicating the suspected presence of a document in the envelope producing such suspect signal.

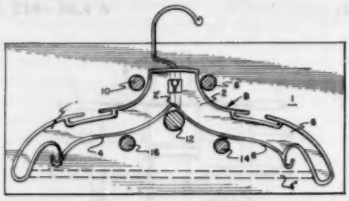
4,016,981
HANGER STACKER FIXTURE

Earl H. Hildt, 2303 Tarleton Lane, Baltimore, Md. 21234

Filed Dec. 31, 1975, Ser. No. 645,603
Int. Cl.² A47F 7/00
U.S. Cl. 211—49 R 1 Claim

1. In combination, a unitary garment hanger of substantially flat form having a single extended neck portion and a pair of oppositely disposed shoulder portions extending outwardly and downwardly from each side of the neck portion forming a junction with the neck portion and with one another in substantially the same plane, the upper edges of the extended neck portion having a concave surface along each of the two side edges to receive the neck portion of the garment, a base of such dimension as to receive the hanger in a horizontal

position, a pair of laterally spaced posts extending upwardly from the upper surface of the base and perpendicular thereto, said posts positioned one on each side of the neck portion of the hanger, a third post extending upwardly from the base parallel with the first two posts and off-set from the plane connecting the two posts in a horizontal central line perpendicular to the center of the plane connecting the first two posts and so positioned on the base as to slideably engage the under edge of the junction of the two shoulder portions, a second



pair of laterally spaced posts fixed to the base parallel with the said third post and spaced outwardly therefrom and on the opposite side of the third post from the first two posts, the second pair of posts located in a plane parallel with the plane of the first two posts, each of the second pair of posts being spaced laterally from the center line at a greater distance than the corresponding first post and positioned on the base to slideably engage the bottom edges of the two shoulder portions of the hanger.

4,016,982

HOLDER FOR A WRITING IMPLEMENT

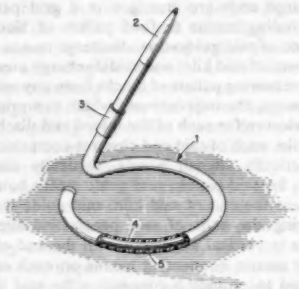
Klaus-Günther Schreiber, Hamburg, Germany, assignor to Messrs. Berendsohn AG, Hamburg, Germany

Filed June 3, 1975, Ser. No. 583,243

Claims priority, application Germany, June 20, 1974, 7420963[U]

Int. Cl.² B43K *23/04*

U.S. Cl. 211—69.1 **3 Claims**



1. A holder in connection with a writing implement, the holder comprising an elongated part being non-detachably connected to the writing implement and being bendable into any shape and to remain in that shape when being bent, said elongated bendable part consisting of a core of material easily bendable by hand and a covering for said core of a material easily bendable by hand.

4,016,983

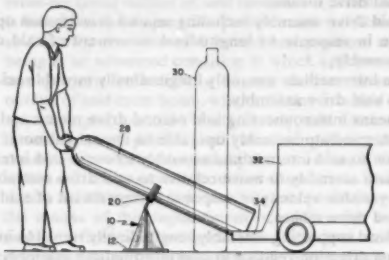
COMPRESSED GAS BOTTLE HANDLER

Andrew J. Dadisman, 4191 Caledonia Drive, San Diego, Calif. 92111

Filed Oct. 16, 1975, Ser. No. 622,946

Int. Cl.² B25J *3/00*

U.S. Cl. 214—1 R **5 Claims**



1. A compressed gas bottle handling device for supporting bottles for movement thereof comprising,

an enlarged flat horizontally extending base plate for supporting said handling device for vertical and horizontal loads,

a vertical plate secured normal to said base plate and extending upward therefrom,

triangular shaped side plate brace means secured to said base plate and said vertical plate along lengths thereof extending from the intersection of said plates,

an upper plate secured to the upper end of the vertical plate and at fixed acute angle therewith,

the upper edge of the upper plate having a semicircular recess formed therein,

a half ring bearing plate secured in said semicircular recess for receiving the cylindrical side surface of a tilted gas bottle for supporting same,

the axial surface of said bearing plate being fixed at an acute angle to the ground surface,

said vertical plate and upper plate having combined lengths that position the half ring bearing plate at a height less than one-half of a gas bottle to be received therein and

a resilient cushion member positioned on the surface of the bearing plate.

4,016,984

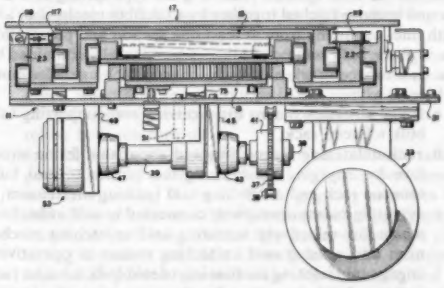
SHUTTLE ASSEMBLY FOR A LOAD HANDLING APPARATUS

George R. Pipes, Salt Lake City, Utah, assignor to Eaton Corporation, Cleveland, Ohio

Filed Aug. 28, 1975, Ser. No. 608,412

Int. Cl.² B65G *65/02*

U.S. Cl. 214—1 BB **10 Claims**



1. A shuttle assembly for use on a load handling apparatus,

and being operable to move longitudinally between a retracted position and an extended position in response to an input drive, said shuttle assembly comprising:

a. a base assembly including a drive means operable to be actuated by said input drive,

b. a drive assembly operatively associated with said drive means to move longitudinally in at least one direction relative to said base assembly in response to actuation of said drive means;

c. said drive assembly including second drive means operable in response to longitudinal movement of said drive assembly;

d. an intermediate assembly longitudinally movable relative to said drive assembly;

e. means interconnecting said second drive means and said intermediate assembly operable to impart harmonic motion to said intermediate assembly to cause said intermediate assembly to move relative to said drive assembly at a variable velocity in response to movement of said second drive means;

f. a load supporting assembly longitudinally movable in said one direction relative to said intermediate assembly; and

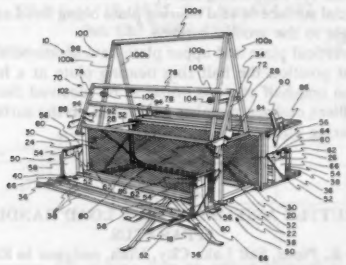
g. means connecting said intermediate assembly and said load supporting assembly and operable to transmit motion of said intermediate assembly, at a first average velocity, into motion of said load supporting assembly at a second average velocity, said second average velocity being at least equal to said first average velocity.

4,016,985

COMBINATION BULK TOBACCO RACK LOADER AND UNLOADER AND METHOD OF UNLOADING A BULK TOBACCO RACK

John Charles Green, Rte. 1, Box 114, Lillington, N.C. 27546, and Ronald Edward Wheeler, Rte. 2, Angier, N.C. 27501

Filed Feb. 14, 1975, Ser. No. 550,122
Int. Cl.² A24B *1/06*
U.S. Cl. 214—5.5 **22 Claims**



1. A bulk tobacco rack unloader for receiving a filled tobacco rack and assisting in the removal of tobacco therefrom, wherein the bulk tobacco rack is of the type having first and second sections latched together by a latching mechanism and with tines extending from at least one section and penetrating through the bulk volume of tobacco peripherally contained by the bulk tobacco rack, said bulk tobacco rack unloader comprising:

a. frame structure means for receiving and supporting said bulk tobacco rack;

b. rack unlatching means disposed about said frame structure for engaging the latching mechanism of said bulk tobacco rack and unlatching said latching mechanism;

c. actuating means operatively connected to said unlatching means for selectively actuating said unlatching mechanism and causing said unlatching means to operatively engage said latching mechanism of said bulk tobacco rack and to unlatch the same whereby one section of said rack may be removed from the other section thereof; and

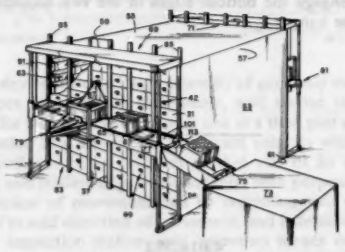
d. said actuating means having retaining means operatively associated therewith and operatively responsive to the operation of said actuating means, said retaining means moveably mounted on said frame structure for movement between an inoperative position and an operative retaining position where said retaining means engages and lies across the entire bulk volume of tobacco within said rack for effectively stripping the bulk volume of tobacco from said tines of said one rack section as said one rack section is removed from said rack unloader.

4,016,986

CLOSURE SYSTEM

Paul M. Thomas, Paradise Valley, Ariz., assignor to Builders Equipment Co., Phoenix, Ariz.

Filed Apr. 14, 1975, Ser. No. 567,531
Int. Cl.² F26B *3/18*; B65G *1/06*
U.S. Cl. 214—16.4 A **3 Claims**



1. In an apparatus for storing pallets of uncured concrete blocks during the curing thereof comprising a kiln having a front infeed and a rear discharge end, a plurality of guideways in said kiln each of which extends from the front end to the rear end of said kiln, each of said guideways being proportioned to receive a series of the pallets being stored, said guideways being arranged in a pattern wherein guideways are disposed in horizontally aligned layers and vertically aligned tiers whereby the ends of said guideways adjacent said infeed and discharge ends are arranged in a grid pattern, infeed means including means to feed pallets of blocks into any selected one of said guideways, discharge means adjacent the discharge end of said kiln, and said discharge means including means for receiving pallets of blocks from any selected one of said guideways, the improvement which comprises:

an end closure for each of the infeed and discharge ends of said kiln, each of said end closures comprising a plurality of vertically aligned panels, vertically disposed guide means for said panels, said guide means being supported adjacent the end of said kiln, said guide means slidably engaging the ends of said panels and supporting said panels in vertical alignment with the end of said kiln, a lifting means, connecting means on each of said panels adapted to provide a connection for said lifting means, means for positioning said lifting device adjacent a preselected panel, and means for actuating said lifting means to engage it with said connecting means on said panel and to raise said preselected panel and panels above said preselected panel whereby said blocks may be inserted into the infeed end of said guideways and said blocks may be withdrawn from the discharge end of said guideways.

4,016,987
STORAGE SYSTEM

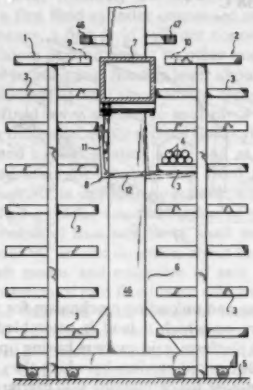
Paul Stolzer, Achern, Germany, assignor to Stopa Stahlbau GmbH & Co., Achern (Gamshurst), Germany

Continuation-in-part of Ser. No. 475,242, May 31, 1974, Pat. No. 3,977,542. This application Apr. 14, 1976, Ser. No. 676,885

Claims priority, application Germany, Apr. 23, 1975, 2517900

Int. Cl.² B65G 1/06

U.S. Cl. 214—16.4 A **18 Claims**



1. In a storage system including a plurality of storage frames positioned in a storage area; each frame having a length dimension extending parallel to the width of the storage area; the storage frames being aligned in the direction of depth of the storage area; a gantry movable parallel to the depth of the storage area; a horizontal cross beam vertically movably mounted on the gantry and having a length dimension oriented parallel to the width of the storage area for lowering the cross beam into the service area defined between two selected adjoining storage frames; the cross beam having a cross-sectional outline; a plurality of tines secured to the cross beam along the length thereof for depositing articles into and removing articles from selected storage frames; each tine being formed of a first and a second tine arm rigidly attached to one another at an approximately right angle; each tine being swingable in a vertical plane about a pivotal support situated in the zone of connection of the tine arms, into first and second operative positions offset about 90° with respect to one another; in the first operative position the first tine arm extending horizontally in one direction perpendicularly to the cross beam and the second tine arm extending vertically from the pivotal support; in the second operative position the second tine arm extending horizontally in the other, opposite direction perpendicularly to the cross beam and the first tine arm extending vertically from the pivotal support; the improvement comprising suspension means for securing each tine to said cross beam, said suspension means including

a. a carrier arm extending generally vertically downwardly from an underside of said cross beam; said carrier arm having upper and lower portions; said tine being secured, at least indirectly, to the lower portion of said carrier arm;

b. mounting means for displaceably securing said carrier arm at its said upper end beneath said cross beam adjacent said underside thereof, said mounting means defining, for said carrier arm, a horizontal path of travel extending transversely to the length dimension of said cross beam and having a length approximately corresponding to the width of said cross beam measured parallel to the depth of said storage area; said carrier arm having first and second opposite end positions at respective opposite ends of said path of travel; when said tine is in said first operative position and simultaneously, said carrier arm is in said first end position, said tine being in an advanced condition in which said first tine arm projects substantially beyond said cross-sectional outline of said cross beam; when said tine is in said first operative position and simultaneously, said carrier arm is in said second end position, said tine being in a withdrawn condition in which substantially the entire tine is disposed within said cross-sectional outline of said cross beam; when said tine is in said second operative position and simultaneously, said carrier arm is in said second end position, said tine being in an advanced condition in which said second tine arm projects substantially beyond said cross-sectional outline of said cross beam; when said tine is in said second operative position and simultaneously, said carrier arm is in said first end position, said tine being in a withdrawn condition in which substantially the entire tine is disposed within said cross-sectional outline of said cross beam; and

c. means for tilting said tine about its said pivotal support in the course of the displacement of said carrier arm and said tine from said advanced condition into said withdrawn condition for effecting a more inclined orientation of the horizontal tine arm downwards towards its said pivotal support in the withdrawn condition than in the advanced condition in the same operative position of the tine.

4,016,988
APPARATUS FOR INTRODUCING WASTE OR THE LIKE INTO A COLLECTING CONTAINER

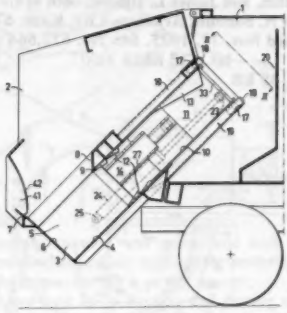
Åke Bertil Ingemar Dahlin, Blomstermala, Sweden, assignor to Norba Aktiebolag, Blomstermala, Sweden

Filed Dec. 1, 1975, Ser. No. 636,378

Claims priority, application Sweden, Dec. 9, 1974, 7415348

Int. Cl.² B65G 65/30

U.S. Cl. 214—17 C **9 Claims**



1. Apparatus for introducing refuse into a collecting container, comprising

a load hopper forming a shaft leading to said collecting container and having an inlet opening for receiving refuse;

a pair of gripping members, which are movable in said shaft;

means for moving said gripping members towards each other, when they are positioned in the inlet opening end of said shaft to hereby grip and compress a portion of refuse between themselves;

means for advancing said gripping members and said refuse portion held by them towards said collecting container;

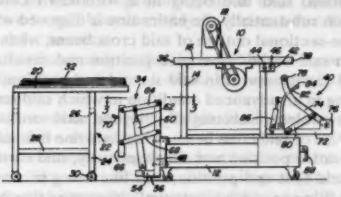
means for releasing the hold of said gripping members on said refuse portion and for separating said gripping members from each other, when they have reached the collecting container end of said shaft to hereby introduce said refuse portion into said collecting container; and

means for returning said gripping members to the inlet opening end of said shaft.

4,016,989
WORK HANDLING APPARATUS

Anthony Furnari, 107 Greenview Drive, Indiana, Pa. 15701

Filed May 20, 1975, Ser. No. 579,256
Int. Cl.² B65G 67/02
U.S. Cl. 214—38 R 8 Claims

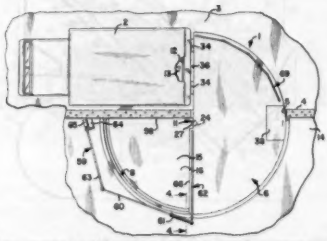


1. In combination with a machine having a base and a horizontal work surface adapted to support a workpiece thereon, apparatus for transferring the workpiece between said work surface and a first transport device, including a frame attached to said base, vertically movable lift means engageable with said first transport device for elevation thereof from a lower horizontal position spaced below the work surface, link means interconnecting the frame and the lift means for constraining movement of said first transport device between said lower position and an upper tilted position downwardly inclined relative to said work surface, and power operated means connected to the link means for displacement of said first transport device to said upper position to enhance transfer of the workpiece to the work surface, said link means comprising a pair of link elements pivotally interconnected between the frame and the lift means in non-parallel relation to each other.

4,016,990
ROTATABLE DOCK

Lester H. Hodkin, and James L. Hinson, both of c/o Mid-West Supply, 214 N. Summit, Arkansas City, Kans. 67005

Filed Nov. 17, 1975, Ser. No. 632,564
Int. Cl.² B61B 1/00
U.S. Cl. 214—38 BB 8 Claims



7. A loading structure comprising:

a. a building having a wall alongside of a drive for cargo carrying vehicles, said building having a floor approximately at normal dock heighth and a door opening in said wall;

b. a dock platform generally semicircular in shape and having a straight edge adjacent to and substantially parallel to said building wall and a periphery inside and adjacent one side of said door opening, said dock platform having a radial dimension less than the width of the door opening;

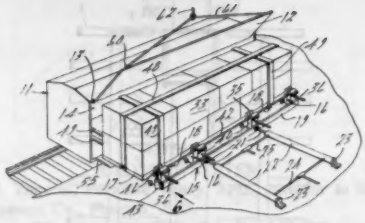
c. means mounting said dock platform in the building for rotation about an axis adjacent to the other side of said door opening with rotation of the dock platform moving a portion thereof outwardly through said door opening to a cantilevered position with a straight edge of the dock platform at an angle of as great as 90° to the building wall and for substantially engaging a rear portion of a cargo vehicle positioned in the drive for loading and unloading; and

d. power means operatively connected to said dock platform for selectively rotating same.

4,016,991
RAILWAY LOADING AND UNLOADING SYSTEM

William G. Oldford, 4944 Lakeshore, Lexington, Mich. 48450

Continuation of Ser. No. 459,478, April 10, 1974, abandoned.
This application Nov. 18, 1975, Ser. No. 633,109
Int. Cl.² B65G 67/02
U.S. Cl. 214—38 C 5 Claims

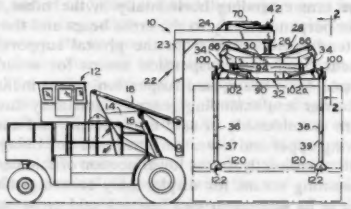


1. In a loading and unloading mechanism for a transporting unit, a platform on which a load is assembled, carriers for supporting said platform, said carriers having upper and lower portions, wheels on said carriers by which they are advanced and retracted, means for connecting said carriers so as to have them operate as a unit, spaced runners on the bottom of the platform on which the platform rests when the carriers therebetween are removed, ramp means between said portions for raising and lowering the height of the carriers upper portions for moving the platform from and onto the runners, means for advancing and retracting said carriers to and from the railway car; U-shaped securing means for latching fingers are provided at the bottom of the side opening of the transporting unit adjacent to the floor, and a bridging member having spaced projecting fingers on one edge for engaging said securing means with the other edge resting on the dock for bridging the space therebetween.

4,016,992
LIFT TRUCK WITH ROTATABLE LOAD-HANDLING APPARATUS

Richard L. Larsen, and James J. Robnett, both of Portland, Oreg., assignors to Raygo Wagner, Inc., Portland, Oreg.

Continuation of Ser. No. 474,618, May 30, 1974, abandoned.
This application Jan. 26, 1976, Ser. No. 652,556
Int. Cl.² B66C 23/00
U.S. Cl. 214—147 G 4 Claims



1. In a lift truck having a load-lifting mechanism at its forward end for handling heavy loads,

a boom means for attachment to said load-lifting mechanism including a generally horizontally disposed boom portion forwardly of said truck,

a load carriage means spaced vertically below said boom portion,

a vertical pivot shaft means rotatably supported by said boom portion and extending downwardly therefrom, a lower portion of said pivot shaft means being affixed to said carriage means to suspend and rotatably support said load carriage means below said boom portion,

and fluid cylinder operated rotation means carried by said boom portion and connected to said pivot shaft means for pivoting said shaft means in opposite directions about the vertical axis thereof through an arc of at least 180° and thereby pivoting said load carriage means and any load carried thereby to the same extent,

said fluid cylinder operated rotation means includes a first floating lever rotatably connected to said pivot shaft means, a first fluid cylinder connected at one end to said boom means, a first fluid cylinder connected at one end to said boom portion and at its other end to said floating lever for rotating said floating lever about said pivot shaft means through at least about 90° in opposite directions, a second fixed lever affixed to said pivot shaft means for rotation therewith, and a second fluid cylinder connected at one end to said floating lever and at its other end to said fixed lever for pivoting said fixed lever through at least about 90° in opposite directions, whereby extension of said first cylinder causes rotation of said floating and fixed levers and thus said pivot shaft means through at least about 90° in one direction about the vertical axis of said shaft means and extension of said second cylinder causes rotation of said fixed lever relative to said floating lever and thus said shaft means at least about an additional 90° in the same said one direction, wherein said load carriage means includes a first horizontally disposed rotatable carriage frame suspended directly from said pivot shaft means to rotate therewith and a second horizontally disposed load pickup carriage frame spaced below said rotatable carriage frame, flexible suspension means suspending said pickup carriage frame from said rotatable carriage frame, and load pickup means carried by said pickup carriage frame, whereby operation of said rotation means to rotate said pivot shaft means causes rotation of said pickup carriage frame and any load supported thereby; said flexible suspension means includes a plurality of flexible members each are connected to a corresponding fluid cylinder operated slope adjustment means on said rotatable carriage frame for adjusting the slope of said pickup carriage frame at least laterally and longitudinally relative to said rotatable carriage frame.

4,016,993

LOAD CLAMPING APPARATUS

Hans Tax, and Dieter Bauer, both of Munich, Germany, assignors to Hans Tax, Munich, Germany

Filed Mar. 18, 1976, Ser. No. 668,290

Claims priority, application Germany, Mar. 24, 1975, 2512927

Int. Cl.² B60P *3/00*; B66C *3/16*

U.S. Cl. 214—394 **6 Claims**

1. Clamping apparatus comprising:

a. an elongated carrier;

b. two clamping jaws spaced longitudinally of said carrier;

c. guide means on one of said jaws engaging said carrier for guiding longitudinal movement of said one jaw relative to said carrier and angular movement of said one jaw about an axis transverse to the direction of elongation of said carrier;

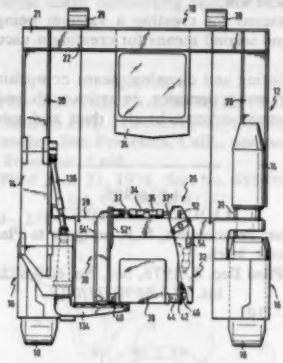
d. cooperating blocking means on said carrier and on said one jaw for blocking said longitudinal movement of said one jaw in response to said angular movement of said one jaw;

e. first load gripping means mounted on a portion of said one jaw spaced from said axis;

f. second load gripping means on the other jaw, said first and second load gripping means facing each other for gripping a load therebetween;

g. first drive means for actuating said longitudinal movement of said one jaw; and

h. second drive means for moving said first load gripping



means on said one jaw toward said second load gripping means and for thereby angularly moving said one jaw about said axis in response to engagement of said first load gripping means with said load.

4,016,994

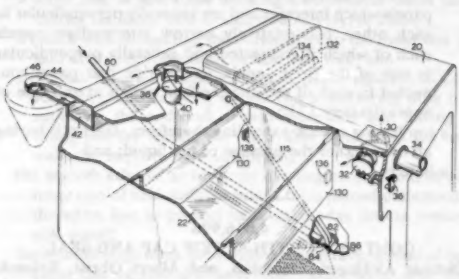
MOBILE VACUUM AND PNEUMATIC UNIT

Wilfred A. Wurster, 7085 Gainer Road, Niagara Falls, Ontario, Canada (L2E 6S5)

Filed Sept. 16, 1975, Ser. No. 613,818

Int. Cl.² B60P *1/04*, *1/60*; B65G *53/28*

U.S. Cl. 214—508 **10 Claims**



1. A mobile vacuum and pneumatic unit for collecting, storing and discharging air conveyable materials, comprising:

a mobile frame, having a power source;

at least one tank for collecting and storing said materials;

an inlet valve for said materials in each said tank, an inlet port, and means for communicating said inlet port to said at least one tank through the inlet valve for such tank;

a float operated outlet valve in each said tank, communicating to an exhaust header duct; said exhaust header duct communicating to air filtering and cleaning means and to a three-way valve having an inlet and direct and second outlets and means for communicating said inlet to either or both of said first and second outlets;

said first outlet of said three-way valve being connected to a first means for creating a vacuum;

said second outlet of said three-way valve being connected to a second means for creating a vacuum;

each of said first and second means for creating a vacuum being connected to said power source;

pressure valve means for communicating the outlet of said second means for creating a vacuum to means for connecting said pressure valve means to a pressure inlet valve of said at leas: one tank;

said three-way valve being operable to have one or the other

or both of said first and second means for creating a vacuum communicating to said at least one tank, whereby material may be drawn into or expelled from said at least one tank at will;

said first means for creating a vacuum being a vacuum pump, and second means for creating a vacuum being a blower;

said air filtering and cleaning means comprising a venturi scrubber and a demister, in series with and interposed between said exhaust header duct and said three-way valve.

4,016,995

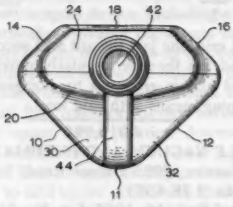
LIQUID CONTAINER

John S. Frazer, Pequannock, N.J., assignor to Plastipak Packaging, Detroit, Mich.

Filed Dec. 8, 1975, Ser. No. 638,622

Int. Cl.² B69D *21/00*

U.S. Cl. 215—10 **27 Claims**



1. A liquid container, comprising:

a series of side panels with at least the lower portion of the container having five principal panels, two wide front panels which intersect and are generally perpendicular to each other, two relatively narrow intermediate panels each of which is connected and generally perpendicular to one of the front panels, and a wide rear panel connected to each of the intermediate panels at an angle of approximately 135°;

a top having a neck extending therefrom, the neck having an opening for the passage of the liquid; and

a bottom.

4,016,996

CONTAINER WITH SCREW CAP AND SEAL

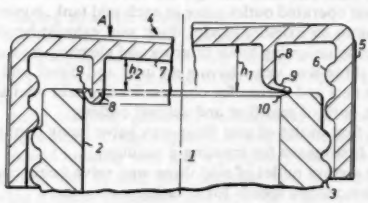
Dietmar Aichinger, Arlesheim, and Albert Obrist, Reinach, both of Switzerland, assignors to Albert Obrist AG, Reinach, Switzerland

Filed June 22, 1976, Ser. No. 698,597

Claims priority, application Germany, July 1, 1975, 2529340

Int. Cl.² B65D *53/00*

U.S. Cl. 215—344 **4 Claims**



1. In the combination of a pressurized container having an externally screw threaded neck and a synthetic plastics screw stopper comprising an internally threaded screw cap and a seal part protruding centrally from the cap top and having an outwardly protruding seal section which on introduction into the container neck is bent back outwards and abuts in sealing manner with its outer portion on the cylindrical inner wall of the container neck, the improvement that the external screw threading of the container neck, the internal threading of the screw cap, the seal part, and the seal section are so formed in relation to one another that at least in the first application of the screw stopper to the container the seal section engages with the container neck and is bent back at least partially by the latter before the external screw threading and the internal threading engage with one another.

4,016,997

VESSEL FOR CONVEYING A LIQUID/GAS MIXTURE

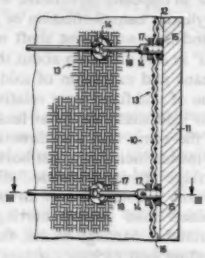
Josua Roffler, Winterthur, Switzerland, assignor to Sulzer Brothers Limited, Winterthur, Switzerland

Filed Mar. 7, 1975, Ser. No. 556,461

Claims priority, application Switzerland, Mar. 8, 1974, 3267/74

Int. Cl.² B65D *7/22, 7/49*

U.S. Cl. 220—10 **10 Claims**



1. In combination with a metallic vessel having an interior wall defining at least a portion of a flow path for conveying wet steam from an inlet toward an outlet of said vessel, at least one metallic wire mesh having disposed adjacent said wall to protect said wall from wet steam in said path, said lining being disposed at least in a region where said wall would be subject to cavitation-erosion by the wet steam flowing along the side of said lining opposite to that side of said lining facing said wall, said lining having apertures therein with the mean diameter of said apertures being smaller than the mean diameter of drops in the conveyed wet steam, said apertures being such as to permit formation of a layer of water on said lining during conveyance of the wet steam.

4,016,998

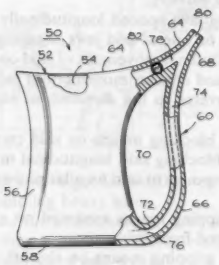
DRINKING VESSEL

Leonard Finch, 8765 Tyrone Ave., Van Nuys, Calif. 91402

Filed Apr. 1, 1976, Ser. No. 672,674

Int. Cl.² A47G *19/22*

U.S. Cl. 220—90.2 **3 Claims**



1. An improved drinking vessel comprising a container and

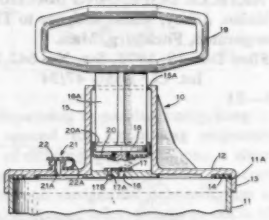
an integrally associated drinking straw combination; said container having a flat bottom lying in a horizontal plane, a top extending on an arcuate plane, and a generally cylindrical mid-section having a reduced portion intermediate said top and bottom, a lip portion extending inwardly from and entirely around the top of said container and lying in the same plane as said top, a handle located at one side of said container and formed integrally therewith, said handle having an upper portion projecting upwardly and outwardly from the upper end of said side of the container, and a generally vertically extending portion integral at its upper end with said upper portion, said extending portion of said handle being laterally displaced from said side of the container during most of its length to form a finger receiving cavity, said extending portion of said handle having its lower end terminating at and integral with said bottom of the container, a straw comprising a first and second channel terminating into a common channel, said first channel being formed within the lower portion of the extending portion of the handle and serves to connect the bottom of the container's interior with said common channel, said second channel being formed within said upper portion of said handle and serves to connect the top of the container's interior with said common channel, said common channel being formed in the upper portion of the extending portion of said handle and terminating at the upper lateral tip thereof, whereby the contents of the container can be simultaineously drawn through both channels into said common channel.

4,016,999

AIR EVACUATING CLOSURE

Alan R. Denzer, Greenwich, Conn., assignor to Zamax Manufacturing Co., Inc., Belleville, N.J.

Filed June 15, 1976, Ser. No. 696,202
Int. Cl.² B65D *51/16*
U.S. Cl. 220—231 **1 Claim**



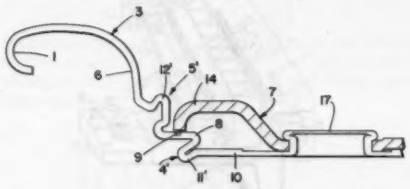
1. A device for evacuating a container comprising:
a closure adapted to seal the open end of a container,
said closure having a circumscribing sealing edge adapted to rest on the edge of a container,
a tubular extension projecting above said closure, said closure having an opening located within the area defined by said tubular extension, said opening being in direct communication with the interior of the container,
a flapper valve for normally sealing said opening closed
a piston slideably disposed within said tubular extension,
a piston rod connected to said piston,
said piston comprising a sealing cup having a connected circumscribing flexible sealing flange,
said sealing flange defining with the walls of said tubular extension a unidirectional exhaust valve,
a handle connected to said piston rod for actuating said piston,
and a vent means in said closure for venting the interior of the container to facilitate the removal of said closure when the interior of the container is under a negative pressure,
said vent means including a vent opening defined by a projecting boss formed on said closure,
said vent opening communicating directly with the interior of said container, and
a vent closure for sealing said vent opening,
said vent closure being frictionally secured to said boss for sealing said vent opening,
and a flexible hinge connecting said vent closure to said boss.

4,017,000

EASY OPEN CONTAINER END WITH PROTECTIVE EDGES FOR ITS SEVERED SCORE

Keith R. Woodley, San Francisco, Calif., assignor to Wescan, Inc., San Francisco, Calif.

Filed June 21, 1976, Ser. No. 698,093
Int. Cl.² B65D *41/32*
U.S. Cl. 220—270 **4 Claims**



1. In an easy opening container end including
a generally annular curled edge for seaming upon a open end of a container side wall;
an end wall closing the open end of the container and having
a pair of generally annular double-reverse folds with a common band between them, and
a score line in said band defining a removable panel that carries the inner one of said double-reverse folds;
a chuck wall connecting the curled edge to the outer one of said double-reverse folds of said end wall; and
a pull tab secured to said removable panel adjacent to said score line and carrying at one end a fracturing nose for rupturing the end wall at said score line and having a lifting end for tearing the removable panel from the end wall, the improvement comprising
the smooth edge of an inwardly opening reverse fold of the inner one of said double-reverse folds placed underneath the score line to protect its severed edge on the removable panel;
the smooth edge of an outwardly opening reverse fold of the outer one of said double-reverse folds placed over the score line to protect its severed edge that remains integral with the chuck wall;
the pull tab placed with its fracturing nose spanning the score line to prevent its accidental rupture; and
the smooth edge of the outwardly opening reverse fold of the outer one of said double-reverse folds flattened outwardly and upwardly in the region of the pull tab fracturing nose to provide clearance and rupture protection for said nose.

4,017,001

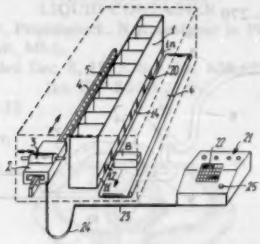
ELECTROMAGNETIC SYSTEM FOR PROPULSION AND PROGRAMMED POSITIONING

Maurice Barthalon, Verrieres, and Andre Subtil, Venissieux, both of France, assignors to Maurice Barthalon, Verrieres, France

Filed Sept. 29, 1975, Ser. No. 617,728
Claims priority, application Luxembourg, Jan. 10, 1975, 71614
Int. Cl.² B65G *1/10*
U.S. Cl. 221—5 **54 Claims**

1. An electromagnetic system for propulsion and programmed positioning for carrying out the displacement of objects in accordance with requirements and the control of

said displacements, comprising a propulsion device formed by a magnetizing assembly and a magnetized assembly which are capable of moving with respect to each other, the magnetizing assembly being provided with at least one uniform row of N magnetic circuits fitted with inductance windings and having N poles or pairs of poles, a magnetized assembly provided with at least one uniform row of N′ magnetic cores separated by non-magnetic sections and having a pitch which is different from that of the magnetic circuits, said system being further provided with a device for supplying electric power to the windings in the form of a sequence of unidirectional electrical pulses fed successively to said windings, wherein the ratio of



pitch of circuits to pitch of cores is equal to $(Kn \pm 1)/(n)$, where K and n are whole numbers, wherein one of the two assemblies of the propulsion system is connected to a container which contains at least one object and the other assembly is connected to a device for withdrawing the object from the container, and wherein the system comprises an electronic device for the programmable control of said sequence, the program being such as to comprise a series of whole numbers of pulses such that each whole number corresponds to one stationary position of the propulsion and programmed-positioning device for placing the object-withdrawal device in oppositely-facing relation to the stored object to be withdrawn.

4,017,002

DISPENSING MOIST TREATED TOWELS OR TISSUES

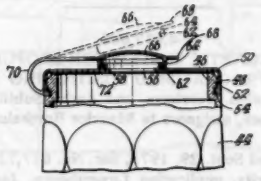
Ross L. Doyle, Ramsey, N.J., and Thomas S. Harrison, New Canaan, Conn., assignors to Sterling Drug Inc., New York, N.Y.

Continuation-in-part of Ser. No. 856,096, Sept. 8, 1969, abandoned, and a continuation-in-part of Ser. No. 128,800, March 29, 1971, abandoned, and a continuation-in-part of Ser. No. 222,882, Feb. 2, 1972, abandoned. This application Jan. 11, 1974, Ser. No. 432,620

Claims priority, application United Kingdom, Apr. 1, 1970, 15535/70; Canada, Aug. 10, 1970, 92035

Int. Cl.² B65H *1/00*

U.S. Cl. 221—63 **6 Claims**



1. A dispenser containing a continuous web of wet absorbent material in compacted form having sheets connected in end-to-end relationship separated by a scored line, and from which the respective sheets can be readily dispensed, one at a time, comprising:

a self-sustaining container of impervious material, including a body containing a supply of said wet continuous web in a compacted form such as to create a minimum of friction within the body of the container as the web is withdrawn through a dispensing opening in the container,

a closure for said container,

means defining a dispensing opening for said container through which the web is withdrawn and sheets of said web can be automatically separated as each sheet is pulled through said opening, leaving a tip of the next sheet exposed above the dispensing opening,

said means including a slit opening and associated resilient flap edges normally sealing said slit in the absence of the web therebetween wherein said flap edges exert a frictional force on the web as it is pulled therethrough, which force is greater than that necessary to separate adjacent sheets of said web, but which force is insufficient to sever the web in the absence of the scored line,

said frictional force exerted by the flap edges on the web being the sole means for causing the web to sever at the scored line above the dispensing opening, thereby exposing the next leading end of the web which may be readily grasped for subsequent extraction of additional sheets,

said minium friction within the body of the container as the web is withdrawn through the dispensing opening in the container, being sufficiently low so as to permit the perforated scored line of said web to at least partially go through the dispensing opening and cause severance of the web above the dispensing opening to ensure that a sufficient amount of the next sheet of said web extends above the opening so that it can be grasped to dispense the next sheet.

4,017,003

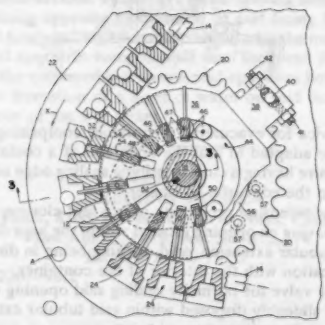
ARTICLE DISPENSING MACHINE

Richard N. Heino, Ashby, Mass., assignor to The Lakso Company, Incorporated, Fitchburg, Mass.

Filed Dec. 18, 1975, Ser. No. 642,158

Int. Cl.² B65G *47/34*

U.S. Cl. 221—81 **3 Claims**



1. In an article dispensing machine which has conveyor means including holder means providing a multiplicity of cavities having an open end for receiving therein the articles to be dispensed, feed means for feeding articles to be dispensed into said cavities, tilt means for tilting said holder means to a position in which articles in the cavities thereof may discharge by gravity, and means for moving said conveyor in an endless path between said feed means and said tilt means,

the improvement comprising the combination of,

cavity defining wall means in said holder means having an apertured portion providing access therethrough to the interior of each cavity at each article holding location therein, and

ejector means operative on said holder means while tilted, and having ejectors inserted through said apertured portion of said wall means at each said location in each said cavity into the positions occupied by the articles before discharge to engage and dislodge articles retained therein,

said holder means comprising a plurality of elongated slats connected for movement by said conveyor means in a direction transverse to their length and having said cavities formed therein, said tilt means including means for causing said slats to move partially about an axis, and said ejectors being arranged for eccentric travel about said axis.

4,017,004

PAPER MONEY DISPENSING APPARATUS

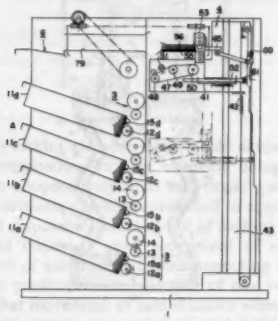
Katsuhiko Onoe; Masahiro Abe, and Masashi Tamura, all of Himeji, Japan, assignors to Glory Kogyo Kabushiki Kaisha, Hyogo, Japan

Filed Feb. 19, 1975, Ser. No. 550,910

Claims priority, application Japan, Feb. 22, 1974, 49-20417; July 3, 1974, 49-76002

Int. Cl.² B65H *3/44*

U.S. Cl. 221—94 **2 Claims**



1. A sheet dispensing apparatus comprising a plurality of sheet storing spaced for containing respectively therein stacked sheets of different denominations, a sheet dispensing section having sheet dispensing means for dispensing sheets of a predetermined and designated denomination taken out of said sheet storing space, inlet means in each of said sheet storing spaces for charging sheets of the respective denominations thereinto and means for urging the sheets charged into said space further into said sheet storing space thereby to position the foremost sheet at a position for being easily removed from the space at the end thereof remote from the end having said inlet means, both said inlet means and said sheet dispensing section being provided at the same side of the apparatus, sheet removal means in each of said sheet storing spaces and comprising a sheet removal device provided at a position confronting the foremost sheet in the sheet storing space, movable sheet receiving means movable past the ends of said sheet storing spaces having said removal means therein and including means for moving said sheet receiving means selectively to a position confronting a sheet removal device corresponding to a designated denomination and for stopping said sheet receiving means of a time sufficient for receiving and temporarily storing thereon a plurality of sheets taken successively out of the sheet storing space by the sheet removal device, said sheet receiving means further having a transferring device for simultaneously transferring all said temporarily stored sheets to said sheet dispensing means when a designated number of sheets of each denomination have been stored, and said sheet dispensing means comprises a sheet conveying device which is in a watch-and wait attitude at the transferring end of said transferring device for receiving thereon the sheets transferred by said transferring device and conveying the thus received sheets to the sheet dispensing section.

4,017,005

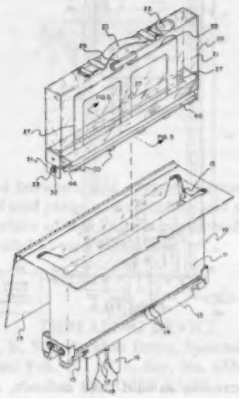
CORRUGATED DISCHARGE CONTROL DEVICE FOR A DISPENSER

Andrew P. Forbes, Jr., R.D. No. 2, Mount Holly, N.J. 08060

Filed Aug. 27, 1973, Ser. No. 388,587

Int. Cl.² B67D *5/08*

U.S. Cl. 222—47 **8 Claims**



1. An improved toner dispenser for a xerographic copying machine that is equipped with a toner dispensing apparatus comprising a toner well and an open grate located at the bottom of the well, said grate being subjected to reciprocal movement to dispense toner particulate to the internal copying apparatus, and wherein in the improved toner dispenser,

a. an enclosed container capable of holding toner particulate and fitting into the horizontal cross-section of the well,

b. a dispensing means in the container capable of dispensing toner particulate when provided with reciprocal motion force,

c. at least one anti-caking arm connected directly to the dispensing means responsive to the reciprocal motion force and extending vertically into the container, and

d. transmitting means to transmit the reciprocal force from the xerographic machine to the dispensing means and anti-caking arm comprising at least one foot to engage in one of the openings of the grate such that the foot is subjected to the reciprocal movement of the grate.

4,017,006

APPARATUS FOR HEATING AND DISPENSING BOILING LIQUIDS

Harvey Wilder, 1725 Crest Drive, Hagerstown, Md. 21740

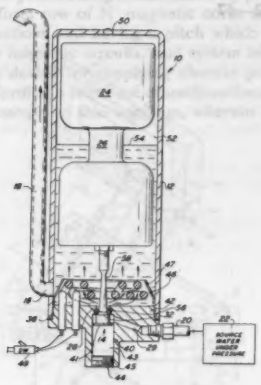
Filed May 5, 1975, Ser. No. 574,473

Int. Cl.² B67D *5/08*

U.S. Cl. 222—67 **13 Claims**

1. Apparatus for dispensing liquid at its boiling temperature comprising a housing having an inlet means for connection to a source of liquid under pressure and an outlet for discharging a boiling liquid, a spigot connected to said outlet, said spigot extending to an elevation above the liquid-vapor interface and terminating at a discharge port above the elevation of said outlet, the upper end of said housing being closed so that it may confine a vapor of the liquid above liquid level, a float in said housing above the elevation of said outlet and responsive to the liquid-vapor interface, an inlet valve means for controlling flow through said inlet into said housing, said valve means including a metering valve member, said metering valve member being coupled to said float for movement therewith in response to the elevation of said float in said housing, an electrical heater means in said housing for rapidly heating liquid to its boiling temperature and for creating a vapor in the zone above liquid level so that said inlet valve means is con-

trolled in response to the elevation of the liquid-vapor interface in aid housing, whereby the rate of flow of said liquid through said inlet into said housing increases as said float



descends and decreases as said float ascends, and an on-off switch means for operating said heater means to initiate the discharge of boiling liquid through said outlet.

4,017,007

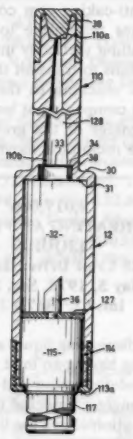
SINGLE DOSE AIR PRESSURE OPERATED DISPENSER

Pasquale R. Riccio, Salem, N.H., assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Continuation-in-part of Ser. No. 427,855, Dec. 26, 1973, abandoned. This application June 24, 1975, Ser. No. 589,838

Int. Cl.² B05B *7/26;* **B65D** *83/06;* **A61M** *13/00*

U.S. Cl. 222—80 **9 Claims**



1. An air pressure-operated dispenser for spraying a single dose of a fluent material or liquid or powder form, and comprising:

a. a single dose container having a compressed air inlet opening and a closable discharge orifice, the interior space and the inlet opening and the discharge orifice thereof being free from obstructions to the flow of compressed air thereinto and to flow of a mixture of a dose of fluent material present in the interior space from the discharge orifice thereof;

b. means for closing the discharge orifice in a non-dispensing position of the dispenser;

c. an air-compressing piston pump having a compressed air outlet from a compression space thereof; and

d. value means for releasing a flow of compressed air after build-up of a determined excess pressure, the inlet opening of the single dose container being joined to the compressed air outlet of the compression space and wherein the valve means comprise an obturator located at the junction of the inlet opening and the compressed air outlet, the obturator being a breakable diaphragm across the junction, and pin means mounted on the frontal face of the piston of the pump adapted to rupture the diaphragm when the piston reaches a position near the end of its compression stroke.

4,017,008

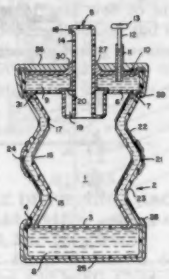
SPRAY CONTAINER

Eli Raitport, 1807 Mower St., Philadelphia, Pa. 19152

Continuation-in-part of Ser. No. 102,330, Dec. 29, 1970, abandoned. This application Oct. 25, 1973, Ser. No. 409,385

Int. Cl.² B65D *35/22*

U.S. Cl. 222—94 **17 Claims**



1. A collapsible container for dispensing comprising two bellows type containers and at least one orifice, whereas one of said bellows being smaller, the other being larger, each of said bellows has at least one opening, the said smaller container placed within the said larger bellows - container forming a space therebetween, said space being filled with flowable substance, said smaller container provided for with an extension which protrudes through the said opening of said larger bellows, each of said bellows has at least one end plate, said end plates of said smaller bellows projects outwardly, said projection fits into grooves provided for on the inside of the walls of said larger bellows forming an interlocking means for both said bellows in such a way that when pressure is applied to said larger container both said bellows are biased to collapse simultaneously, whereas a separate compartment is formed at the end of the container between the ends of said smaller and said larger bellows, and said compartment is filled with a flowable substance.

4,017,009

CHILD SAFETY CLOSURE (METHOD III)

Robert F. Ewald, Rolling Meadows, Ill., and Norbert Normos, Courbevoie, France, assignors to Seaquist Valve Company, Div. of Pittway Corporation, Cary, Ill.

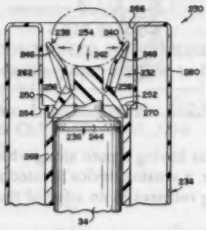
Continuation-in-part of Ser. No. 352,440, April 19, 1973, Pat. No. 3,885,717. This application June 10, 1974, Ser. No. 477,969

Int. Cl.² B65D *83/14*

U.S. Cl. 222—402.11 **5 Claims**

1. A safety adaptor for a fluid dispenser comprising a valve actuator means, control means connected to said valve actuator means and configured to prevent actuation of the valve actuator means by a finger less than a predetermined dimen-

sion, said control means comprising a pair of finger guides disposed in predetermined spaced apart relation to one another, at least one of said finger guides movable relative to the other and including a locking element mounted thereon and movably connected to the valve actuator means, said locking element movable into and out of locking engagement with the fluid dispenser upon movement of said one movable finger guide relative to the other finger guide and said valve actuator means; said valve actuator means comprising a base disposable in engageable relation with a valve mechanism on said fluid dispenser, said one locking element being coupled to said base by resilient interconnecting means such that said locking element is movable between a locked and actuated position relative to said valve actuator means; each of said finger guides including an actuator element, said actuator elements disposed relative to one another to cooperatively form a finger passage therebetween, each of said actuator elements con-



nected to one locking element; each of said actuator elements and said corresponding locking elements being coupled to each other to cooperatively form said finger guides, each of said locking elements movably connected to opposite sides of said base and disposable into and out of locking engagement with the fluid dispenser upon movement of said actuator elements; each of said resilient interconnecting means being attached to a predeterminded portion of one of said finger guides such that movement of said actuator elements relative to one another causes movement of said locking elements relative to one another into and out of locking engagement with the fluid dispenser; and an overcap, said overcap including a stepped inner skirt, said stepped inner skirt comprising an upper and lower wall section integrally connected to one another, the cross-sectional dimension of said overcap being such that said upper wall is greater than the cross-sectional dimension of said lower wall to cooperatively define a locking ledge therebetween.

4,017,010

CLOSURE ELEMENT FOR A SLIDE CLOSURE AND PROCESS FOR THE MANUFACTURE THEREOF

Ernst Meier, Kilchberg, Switzerland, assignor to Stopinc Aktiengesellschaft, Zug, Switzerland

Filed July 11, 1975, Ser. No. 595,307

Claims priority, application Switzerland, July 17, 1974, 9858/74

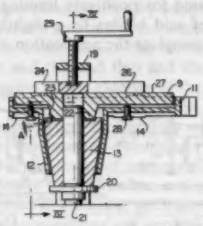
Int. Cl.² B22D *37/00*

U.S. Cl. 222—590 **8 Claims**

7. A process for assembling a closure element of a slide closure for use in liquid melt containers, e.g. steel ladles, said closure element including a metallic support element having bearing surfaces located in a first plane and a refractory plate embedded within said support element by means of a plastic, solidifiable refractory mass and having a first surface embedded in said refractory mass and a second, sliding surface, such that said sliding surface of said plate extends in a second plane parallel to said first plane of said bearing surfaces of said support element, said method comprising:

inserting said plate within said support element; and

prior to solidification of plastic, solidifiable refractory mass material positioned therebetween, positioning and holding said plate in a desired final operational position within an auxiliary device by means of providing adjustable spacers adjustable perpendicularly to said first plane and



positioned between said support element and said first surface of said plate, and adjusting said spacers until said sliding surface of said plate is positioned within a second plane parallel to said first plane.

4,017,011

THREADING DEVICE

Rick P. Ressa, E. 505 Parkhill Drive, Spokane, Wash. 99208

Filed Feb. 17, 1976, Ser. No. 658,184

Int. Cl.² D05B *85/00*

U.S. Cl. 223—102 **2 Claims**

1. An elongated threading device, comprising:

an elongated flexible multi-strand thread;

an elongated wire cable needle;

an interlocking interconnection extending integrally between the thread and the needle;

said thread being constructed of one or more thread filaments that are folded back upon themselves to define multiple thread strands with at least two thread filament bends at an end of the thread;

said wire cable needle being constructed of one or more wire filaments that are folded back upon themselves to form a number of wire strands and wire filament bends corresponding to the number of thread filament bends;

said thread filament bends and wire filament bends being interthreaded and longitudinally offset along the threading device to form said interlocking interconnection between the thread and cable needle; and

wherein the thread strands and wire strands are twisted in opposite directions about a longitudinal axis to form the device.

4,017,012

SEVERING APPARATUS FOR PLASTIC MATERIAL

Reginald L. Brock, Rte. 44, Salisbury, Conn. 06068

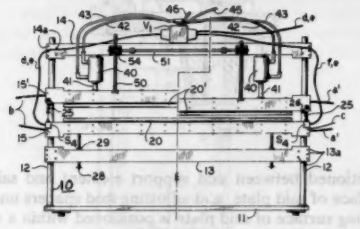
Division of Ser. No. 366,734, June 4, 1973, Pat. No. 3,877,625. This application Nov. 25, 1974, Ser. No. 526,467

Int. Cl.² B26F *3/00*

U.S. Cl. 225—96.5 **20 Claims**

1. A resin severing apparatus for effecting an improved severance of successive individual pieces from a sheet-like body length of solidified thermosplastic resin material which comprises, a frame, a pair of opposed blades operatively carried by said frame and defining a pass for the body length, means for moving one blade of said pair into engagement with the material of the body length and flexing it into engagement with the other blade at the pass and for then simultaneously

applying said pair of blades in the same plane inwardly with aligned cutting-in blade pressure and melting heat along lines of blade engagement fully across opposite sides of the body length to form opposed aligned line recesses therein, means carried by said frame for positively limiting the relative forward movement of said blades to a slightly separated fully in-line relation to complete the application of cutting-in blade



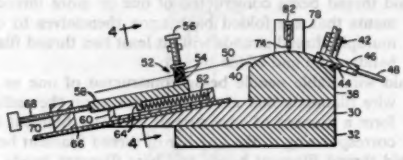
pressure and retain a relatively thin transverse thickness portion between the line recesses, means for thereafter withdrawing the blades relative to each other to release the body length, and means for advancing and cooling the material along the line recesses and for thereafter severing a forward end portion of the body length along the full extent of the thin transverse thickness portion.

4,017,013

MULTIPLE FIBER END PREPARATION

Robert M. Hawk, Bath, and Jerome G. Racki, Painted Post, both of N.Y., assignors to Corning Glass Works, Corning, N.Y.

Filed Dec. 16, 1975, Ser. No. 641,341
Int. Cl.² B26F 3/00
U.S. Cl. 225—96.5 **10 Claims**



1. An apparatus for severing a plurality of glass fibers comprising:

means defining an arcuate surface over which said fibers are adapted to be disposed,

first clamp means at one end of said surface for fixedly clamping said fibers with a force that is sufficient to prevent said fibers from sliding therethrough,

second clamp means disposed at that side of said surface opposite said fixed clamp means for loosely clamping said fibers with a frictional force that is less than that force applied by said first clamp means so that fibers clamped by said second clamp means can slide therethrough if a pulling force is applied thereto which is greater than said frictional force, said second clamp means being movable in a direction extending from said arcuate surface defining means,

means for applying to said second clamp means a force tending to urge said second clamp means away from said arcuate surface defining means, said force decreasing as the distance between said first and second clamp means increases, and

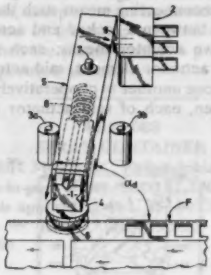
means disposed adjacent to said arcuate surface for scoring said fibers.

4,017,014

APPARATUS FOR SENSING NOTCHES

René Lüscher, Regensdorf, Switzerland, assignor to Gretag Aktiengesellschaft, Regensdorf, Switzerland

Filed Jan. 23, 1976, Ser. No. 651,619
Claims priority, application Switzerland, Jan. 30, 1975, 1126/75
Int. Cl.² B65H 25/02
U.S. Cl. 226—45 **15 Claims**



1. In apparatus having a path along which a strip is longitudinally movable, a sensing device located at a point along said path for sensing recesses in an edge of the moving strip comprising:

a lever mounted to a pivot which is to one side of said path and at right angles to the plane of the strip at said point;

first resilient means urging said lever into a quiescent angular position about said pivot;

means carried by said lever to engage recesses in one edge of the strip moving past said point;

second resilient means acting in the longitudinal direction of said lever for urging said engagement means to bear against said one edge of the strip and to move the said engagement means into engagement with a recess when it arrives at said point whereby said lever couples for associated movement with the film and deflects about said pivot from said quiescent angular position upon continuing movement for the engaged recess;

switching means actuable upon said lever reaching a first pre-selected deflection from said quiescent angular position to indicate the presence of a recess; and

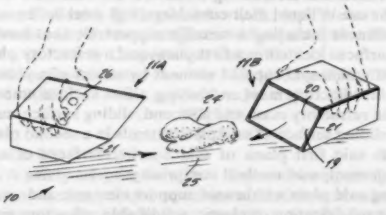
releasing means acting automatically upon said lever reaching a second pre-selected deflection for moving the said engagement out of engagement with the recess, the first pre-selected deflection being less than the second pre-selected deflection.

4,017,015

DISPOSABLE BIODEGRADABLE ENVIRONMENTAL ANIMAL FECES WASTE SCOOP AND CONTAINER

Ray Jefferson, 494 Broome St., New York, N.Y. 10013

Filed Jan. 12, 1976, Ser. No. 648,646
Int. Cl.² B65D 5/38
U.S. Cl. 229—19 **1 Claim**



1. In a disposable, environmental, animal feces waste scoop

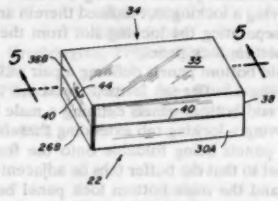
and container, the combination of a pair of interfitting boxes having scoop means for scooping up a feces therebetween and enclosing said feces within said boxes when interfitted; both said boxes being made of corrugated, biogradable cardboard, each box having six sides comprising a wall on each of five said sides while a sixth thereof comprises an opening, an edge of said opening being angularly inclined by one said wall projecting outwardly farthest by protruding farther than an opposite wall thereto so to define a scoop, one of said boxes additionally including a handle die-cut on said furthest projecting wall, said handle being outwardly bendable about a fold line, said handle having a pair of finger-receiving openings therethrough; each said box being formed from a flat, die-cut blank, and one of said five walls which is opposite said opening being comprised of a pair of interfitting and interlocking tabs each of which is formed adjacent an end of said opposite walls, and each said tab includes a minor portion separated from a major portion thereof by a fold line that aligns with a fold line between said walls that form four side walls of said box.

4,017,016

SHIPPING CONTAINER FOR PERISHABLES

Orval D. Ivy, Fort Smith, Ark., assignor to IWN, Inc., Fredonia, Kans.

Filed Mar. 1, 1976, Ser. No. 662,804
Int. Cl.² B65D *13/00, 5/56*
U.S. Cl. 229—23 BT **1 Claim**



1. An improved shipping container comprising:

a body portion of corrugated paper board cut initially in the form of a long, narrow flat rectangle, the width of the rectangle defining the depth of the container, the flat rectangle being scored in four lines parallel the ends, one of the scored lines being adjacent one end defining a sealing tab, the body portion being folded along the scored lines forming an upright open bottom and open top rectangular container, the tab portion being glued to the inner end of the base portion opposite the tab end to retain the base portion in the rectangular configuration;

foam insulation secured to the surface of the body portion to cover all of one side of the body portion except an area adjacent the end opposite the end having the tab portion such that when the body portion is formed as an upright open bottom and open top rectangular container all interior surfaces are covered by insulation;

a top cover initially formed of a flat sheet of corrugated paper board including:

a. a rectangular center portion defining the length and width of the container;

b. an integral end flap portion at each end of the center portion of the same width of the center portion and of length equal to one-half of the depth of said body portion, each end flap being scored at the juncture with the center portion whereby the end flap portions may be folded perpendicular to the center portion; and

c. an integral side flap portion at each side of the center portion of the same length of the center portion and of width equal to one-half of the depth of said body portion, each side flap being scored at the juncture with the center portion whereby the side flap portions may be folded perpendicular to the center portion;

a bottom cover identical to said top cover;

foam plastic insulation secured to one surface of said top and said bottom cover center portions;

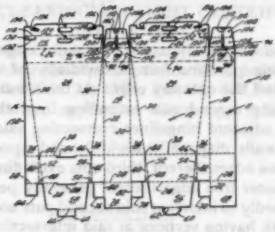
the container being assembled such that the body portion is upright with the center portion of the top cover covering the upper open end of the body portion and the end flap and side flap portions secured by adhesive to the exterior of the body portion and in like manner, the center portion of the bottom cover covers the lower open end of the body portion and the end flap and die flap portions secured by adhesive to the exterior of the body portion, the edges of the end flaps and side flaps of the top cover contacting the edges of the end flaps and side flaps of the bottom cover, the assembled container thereby having all sides of double thickness of corrugated paper board secured by adhesive to each other, and wherein said body portion is formed in a manner such that in the assembled container the corrugations are vertical and wherein said top and bottom covers are such that the corrugations in said side flaps are vertical in the assembled container.

4,017,017

CORRUGATED LUGGAGE

Hendrikus Vos, Winnipeg, Canada, assignor to Domtar Limited, Montreal, Canada

Filed June 28, 1976, Ser. No. 700,443
Int. Cl.² B65D *5/10, 5/46, 25/28*
U.S. Cl. 229—38 **4 Claims**



1. A carton blank and a carton formed therefrom comprising a first end wall panel and a first side wall panel, a second end wall panel and a second side wall panel interconnected by a set of substantially parallel fold lines, each of said side wall panels being divided by a parallity of fold lines arranged substantially in the same pattern in each of said side panels, each said plurality of fold lines defining in its respective said side wall panel, a central trapezonal panel having two sides substantially parallel and forming the top and bottom of said side wall panels and a pair of legs interconnecting adjacent ends of said two parallel sides and converging toward each other at the same angle from said top, each of said legs forming one side of a triangle defined by said bottom end and an adjacent fold line of said set of fold lines, closure means connected to said bottom of said side panels and to said end wall panels by a first bottom fold line means substantially perpendicular to said set of fold line, a second bottom fold line spaced above and substantially parallel to said first bottom fold line means, further fold lines substantially parallel to said set of fold lines and extending from the junction of each of said legs with said second bottom fold line to said bottom fold line means.

4,017,018

CARTON CLOSURE

Ernest C. Pellation, Larkspur, Calif., assignor to Fibreboard Corporation, San Francisco, Calif.

Filed Mar. 29, 1976, Ser. No. 671,624
Int. Cl.² B65D *5/10*
U.S. Cl. 229—39 R **3 Claims**

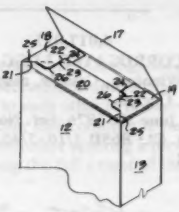
1. A closure for a carton, said carton comprising a front wall, a back wall, a pair of side walls, a bottom closure and a

top closure, said top closure formed so that the inner flaps thereof intermesh with each other to provide support during sealing operations and thus promote a tight seal,

said top closure comprising a pair of minor flaps hinged to the side walls, an inner major flap hinged to the front wall and an outer major flap hinged to the back wall,

said minor flaps and said inner major flap folded inwardly at 90° angles to the respective walls to which they are hinged and said outer major flap folded over into contact with and sealed to said minor flaps and said inner major flap to form said top closure,

first cutaway side edges on sides of said inner major flap adjacent said minor flaps, and second cutaway side edges on each minor flap on a side thereof adjacent said inner major flap, said cutaway edges on one of (a) said minor flaps and (b) said inner major flap, comprising first cuts extending from the side edges thereof adjacent hingelines connecting said flaps to the carton walls diagonally upwardly and inwardly to the free outer edge thereof, and protruding portions formed medially of said cutaway edges, and the cutaway edges on the other of said flaps comprising second cuts extending from the side edges thereof adjacent hingelines connecting said flaps to the carton walls diagonally inwardly and upwardly toward outer free edges thereof, third cuts extending from points on an outer free edge thereof generally perpendicularly downwardly to intersect said second cuts and form angles therewith having vertices at said intersections, the intersections of said third cuts and said outer free edges forming free corners,



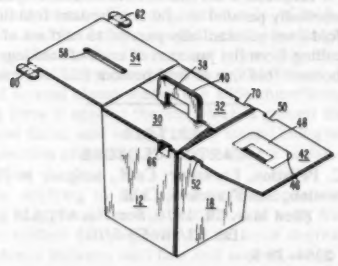
said protruding portions and said free corners comprising means which intermesh when said flaps are in folded position so that portions of said minor flap overlie said inner major flap and portions of said inner major flap overlie said minor flaps, thereby providing support for said flaps during sealing of said outer major flap thereto.

4,017,019

PAPERBOARD CONTAINER

Vernard S. Booth, Albany, Ga., assignor to Olinkraft, Inc., West Monroe, La.

Filed Apr. 5, 1976, Ser. No. 673,850
Int. Cl.² B65D 5/10, 5/46
U.S. Cl. 229—39 R **1 Claim**



1. A paperboard container comprising

four trapezoidal side wall panels, each joined to two adjacent side wall panels along its non-parallel sides,

a bottom formed from bottom panels extending from the short parallel sides of each of the side wall panels,

a handle panel flap extending from each of the top half-panels,

a first top panel having a handle die cut formed therein defining a handle panel flap, the first top panel foldable over the top half-panels so that the handle panel flaps from the top half-panels and the handle panel flap from the first top panel are adjacently aligned,

a second top panel having a handle slot formed therein, the second top panel foldable so that the three aligned handle panel flaps are received through the handle slot,

locking means including a pair of locking fingers extending from opposite sides of the second top panel, opposite sides of the container having top-lock recesses formed therein to receive the locking fingers to secure the second top panel in position,

said first top panel extending from a side of the container opposite the side from which the second top panel extends and said first top panel having top-lock cut-outs defined in opposite sides thereof to receive the locking fingers of the second top panel therein,

top half-panels extending from the sides of the container in which the top-lock recesses are defined, the top-lock recesses also extending into the top half-panels so that the locking fingers can be received therein,

one of said bottom panels defining a female bottom lock panel having a locking slot defined therein and a bridging portion separating the locking slot from the edge of the female bottom lock panel,

a pair of said bottom panels defining a pair of buffer panels each having a buffer tab formed thereon,

another of said bottom panels defining a male bottom lock panel having a locking tab extending therefrom,

the buffer panels being foldable onto the female bottom lock panel so that the buffer tabs lie adjacent the bridging portion and the male bottom lock panel being foldable such that the locking tab is received in the locking slot, the bridging portion thereby holding the buffer tabs against the male bottom lock panel to secure the bottom of the container, and

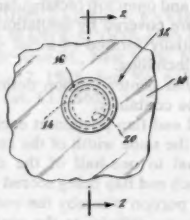
said locking tab being of a generally rectangular shape and being held in the locking slot by frictional forces.

4,017,020

NOZZLE OUTLET IN THE STRETCHABLE FLEXIBLE WALL FOR A CONTAINER

Carl A. Frank, 624 Stanley Place, River Vale, N.J. 07675

Filed Nov. 20, 1975, Ser. No. 633,618
Int. Cl.² B65D 33/16
U.S. Cl. 229—62 **5 Claims**



1. In a flexible bag having its wall formed entirely from stretchable, flexible plastic film material having a thickness in the range from 4 mils to 15 mils, a permanent nozzle outlet for said flexible bag, said nozzle outlet being located in an area of said wall and comprising:

a rigid inner sleeve having an outlet passage therethrough,

said inner sleeve having an exterior tapered surface which converges at a small angle of taper toward a smaller end of said inner sleeve,

said smaller end of said inner sleeve being projected out into said wall of the flexible bag and having a portion of the flexible film wall stretched therearound,

a rigid outer sleeve having an interior tapered surface which diverges at a small angle of taper toward a larger end of said outer sleeve,

said small angle of taper of said interior surface corresponding to said small angle of taper of said exterior surface for mating therewith,

said outer sleeve being mated around the portion of plastic film wall which is stretched around said inner sleeve with said larger end of said outer sleeve facing toward said wall of the bag, said respective exterior and interior surfaces being in wedging-locking relationship with the stretched portion of the film wall being sandwiched between said tapered surfaces,

whereby said mated sleeves are firmly held together by their wedging-interlocking relationship to form a permanent nozzle outlet in the flexible film wall of the flexible bag with said outlet passage in the inner sleeve serving as the passage through the nozzle, and

said stretched portion of the plastic film material temporarily closing said outlet passage and protecting said smaller end of the inner sleeve.

4,017,021

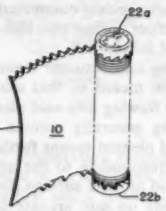
COIN ROLL

Cleveland B. Crudgington, 2798 S. Highland Drive, Las Vegas, Nev. 89102

Filed Mar. 8, 1976, Ser. No. 664,545

Int. Cl.² B65D *65/04*

U.S. Cl. 229—87.2 **6 Claims**



1. A coin roll comprising a cylindrical jacket in the form of a tape surrounding a stack of superposed coins, crimps formed on the opposite ends of said jacket to retain the stack of coins in said jacket, and a circumferential series of oblique parallel slits in the areas of said jacket adjacent to said crimps, said slits extending into said crimps.

4,017,022

CENTRIFUGE ARRANGEMENT AND METHOD OF MAKING A CONICAL CONTAINER THEREFOR

Bernhard Fiedler, Grevenbroich, Germany, assignor to Maschinenfabrik Buckau R. Wolf Aktiengesellschaft, Grevenbroich, Germany

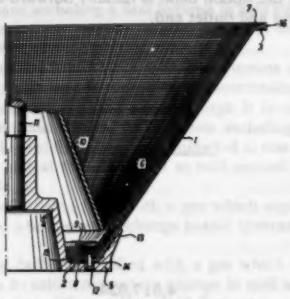
Filed Oct. 17, 1975, Ser. No. 623,455

Claims priority, application Germany, Oct. 24, 1974, 2450552

Int. Cl.² B04B *7/04*

U.S. Cl. 233—1 R **8 Claims**

1. In a centrifuge, a combination, comprising a hub mounted for rotation about an axis and having a central portion, a lip portion radially and outwardly spaced from said central portion having an inner conical face concentric with said axis and extending upwardly and outwardly, and a bottom portion connecting said central portion with said lip portion; a conically shaped container having a circumferential wall having a lower portion closely adjacent said conical surface and including a base portion integral with said circumferential wall; and adhesive means disposed intermediate said lower



portion of said container and said inner conical face of said lip portion for securing said container with said hub so that the former rotates exactly coaxial with the latter without causing an imbalance during fast rotation of said centrifuge.

4,017,023

SELF-CLEANING AIR-TIGHT CENTRIFUGAL SEPARATOR

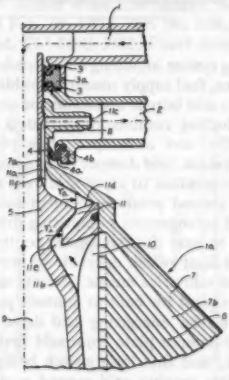
Heinrich Hemfort, Oelde, Germany, assignor to Westphalia Separator Aktiengesellschaft, Oelde Westphalia, Germany

Filed Feb. 23, 1976, Ser. No. 660,541

Claims priority, application Germany, Feb. 27, 1975, 2508503

Int. Cl.² B04B *11/02*

U.S. Cl. 233—1 A **4 Claims**



1. In a self-cleaning, air-tight centrifugal separator comprising:

a rotating drum providing a chamber for the separation, a passageway in the drum having an inlet end for receiving clarified liquid from the chamber and a discharge end for discharge of the clarified liquid from the rotating drum, a stationary discharge conduit connected to the drum for receiving the clarified liquid from the discharge end of said passageway, and a flange packing interposed between the discharge end of said passageway and the stationary conduit for providing an air-tight seal therebetween, the flange packing being of such construction that it is urged so as to provide said seal by the pressure of the clarified liquid,

the improvement which comprises:

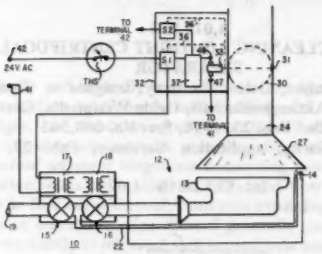
said passageweying having a siphon-like section between passageway inlet end and discharge end for formation of a liquid seal between the passageway discharge end and the drum chamber the siphon-like section being disposed so that the siphon bend is radially outward of the siphon inlet end and outlet end.

4,017,024

STACK DAMPER CONTROL ARRANGEMENT

Martin Coiner Grostick, and Thomas Edward Hayes, both of Goshen, Ind., assignors to Johnson Controls, Inc.

Filed Dec. 3, 1975, Ser. No. 637,322
Int. Cl.² F24D *5/00*
U.S. Cl. 236—16 **15 Claims**



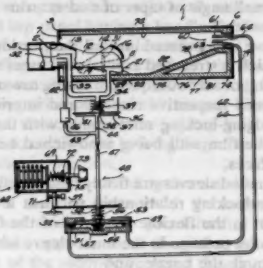
1. In a heating system including a furnace having a fuel-fired burner apparatus, fuel supply means operable when energized to supply fuel to said burner apparatus for combustion, a vent stack for conducting combustion products away from said burner apparatus, and a damper plate pivotally mounted within said vent stack, said damper plate being normally maintained at a first position to close said vent stack, and being rotatable to a second position to open said stack, a stack damper control arrangement comprising drive means operatively coupled to said damper plate, control circuit means including a first limit switch operable to provide a first energizing circuit for said drive means, activate means operable in response to a request for heat to connect power to said first energizing circuit for energizing said drive means to effect rotation of said damper plate from said first position to said second position, said first limit switch being operated when said damper plate reaches said second position to interrupt said first energizing circuit to thereby effect the deenergization of said drive means and to complete an energizing path for said fuel supply means, said control circuit means further including a second limit switch and normally disabled switching means, said second limit switch being operated as said damper plate is moved away from said first position to prepare a second energizing circuit for said drive means, said activate means effecting the deenergization of the fuel supply means and the enabling of said switching means when the heating demand has been met to complete said second energizing circuit for energizing said drive means to effect rotation of said damper plate from said second position to said first position, said second limit switch being operated when said damper plate reaches said first position to interrupt said second energizing circuit to thereby effect the deenergization of said drive means.

4,017,025

VARIABLE VOLUME CONTROL BOX AND SYSTEM INCORPORATING SAME

Konstantins Dravnieks, Madison, and Gordon C. Sylvester, Verona, both of Wis., assignors to Wehr Corporation, Milwaukee, Wis.

Filed Jan. 28, 1974, Ser. No. 436,963
Int. Cl.² F24F *11/04*
U.S. Cl. 236—49 **17 Claims**



1. A control box for use in an air distribution system and comprising, in combination,

plenum means defining an inlet to the interior of said box,

means defining an outlet spaced from said inlet so that air flows through said box from said inlet to said outlet,

a damper positioned at said inlet,

means mounting said damper to assume a first position closed on said inlet and for movement away from said first position to open said inlet,

means biasing said damper in one direction of movement relative to said first position,

air operated actuator means connected to said damper for moving said damper against said bias and opposite to said one direction of movement,

means for exposing said actuator means to the flow of air into said plenum means so that said actuator means is operated by air flowing into said plenum means,

said damper being generally arcuate in transverse cross section and said plenum means further defining an arcuate surface corresponding to the arcuate shape of said damper with said arcuate surface defining said inlet,

said damper closing on said arcuate surface to close said inlet,

and said mounting means defining an axis about which said damper moves in moving toward and away from said first position, the centers about which said arcuate surfaces of said damper and arcuate surface are generated being offset from said axis.

4,017,026

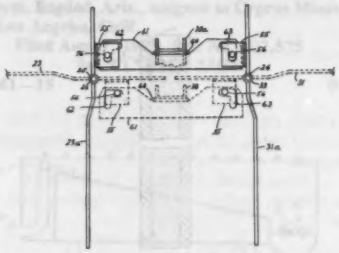
AUTOMATIC DAMPER

John V. Felter, P.O. Box 7464, Houston, Tex. 77008

Filed May 15, 1975, Ser. No. 577,682
Int. Cl.² G05D *23/275*
U.S. Cl. 236—93 R **7 Claims**

1. Automatic damper apparatus, comprising a pair of mirror image vanes pivotal about axes intermediate the widths of the vanes between open and closed positions, means pivotally movable from one side of the inner edges of said vanes in closed position to between said inner edges of said vanes to open said vanes and pivotally movable in the opposite direction to close said vanes, means linking the free end of said pivotally movable means to said inner edges of said vanes comprising pin means on said inner edges of said vanes means and J-slot means on said pivotally movable means having said pin means engaged therein and cooperating to lock said vane means in said open position with said pin means engaged in a transverse J-slot position when said vane means have been

opened by said pivotally movable means, and drive means comprising gas filled diaphragm means for moving said pivot-



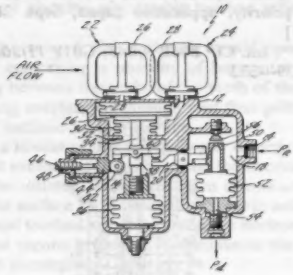
ally movable means in both directions in response to opposite changes in temperature.

4,017,027

LEAD-LAG COMPENSATED TEMPERATURE SENSOR

Lawrence Sidney Smith, Simsbury, Conn., assignor to United Technologies Corporation, Hartford, Conn.

Filed Dec. 3, 1975, Ser. No. 637,490
Int. Cl.² G05D *23/12*
U.S. Cl. 236—99 E **2 Claims**



1. A compensated temperature responsive transmitter for sensing air temperature of an airstream comprising:
a housing having a first and a second chamber;
a pressure responsive element disposed in said first chamber;
a first gas-filled temperature responsive bulb disposed in said airstream;
first bellows between said first bulb and a first area on one side of said element for putting said first bulb in closed fluid communication with said first area to urge it in one direction;
a second gas-filled temperature responsive bulb disposed adjacent said first bulb in said airstream;
second bellows between said second bulb and a second area on the opposite side of said element for putting said second bulb in closed fluid communication with said second area to urge said element in an opposite direction;
said first and second areas being of different magnitude;
said first and second bulbs responding to a temperature change in said airstream at different rates;
inlet means in said second chamber for communicating said second chamber with a supply of fluid under pressure;
valve means disposed in said second chamber for varying the pressure of said supply fluid; and
means responsive to said movement of said pressure responsive element connected to said valve means for controlling the pressure of said supply fluid.

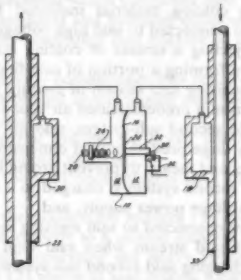
2. A compensated temperature responsive transmitter for sensing air temperature of an airstream comprising:
a housing having a first and a second chamber;
pressure responsive means, including a plate, disposed in said first chamber;
a first temperature responsive bulb means disposed in said airstream and in closed fluid communication with a first surface on said plate to urge it in one direction, said first bulb means including a first bellows in said first chamber connected at one end to said housing and at the other end to said first surface on said plate;
a second temperature responsive bulb means disposed in said airstream and in closed fluid communication with a second surface on said plate to urge it in an opposite direction, said second bulb means including a second bellows in said first chamber connected at one end to said housing and at the other end to said second surface on said plate;
said first bulb being filled with a gas which expands in response to a temperature change in said airstream at a first rate;
said second bulb being filled with a gas which expands in response to said temperature change in said airstream at a second rate different from said first rate;
said pressure responsive means including a third bellows connected at one end to said housing and at the other end to said second surface, said third bellows having an effective cross-sectional area equal to the effective cross-sectional area of said second bellows;
inlet means in said second chamber communicating said second chamber with a supply of hydraulic fluid under pressure;
valve means disposed in said second chamber for varying the pressure of said supply fluid; and
means responsive to movement of said pressure responsive means extending between said first and second chambers for controlling the pressure of said supply fluid.

4,017,028

TEMPERATURE DIFFERENTIAL SENSING AND CONTROL DEVICE

Glora Manor, 19 Kilmer Road, Larchmont, N.Y. 10538

Filed Feb. 28, 1975, Ser. No. 554,270
Int. Cl.² F24J *3/02*; F16H *3/08*
U.S. Cl. 237—1 A **6 Claims**



1. A heating system comprising a heat collector, a thermal reservoir, a first conduit leading from the reservoir to the collector, a second conduit leading from the collector to the reservoir, an electrically-operable pump connected to pump fluid from the reservoir, through the first conduit, the collector and the second conduit and back to the reservoir, and a differential thermostat which comprises a housing having mounted therewithin a flexible diaphragm which divides the interior of the housing into first and second chambers, first and second vessels having their interiors in communication with the first and second chambers respectively, the first vessel and the first chamber containing thermally expansible fluid sealed therewithin and the second vessel and the second chamber also containing thermally expansible fluid sealed therewithin, the first vessel being in thermally conductive

contact with the first conduit and the second vessel being in thermally conductive contact with the second conduit, and the thermostat further comprising an actuating member mounted so as to be displaced by the diaphragm in dependence upon difference in pressure between the first and second chambers, and a control device mounted to be acted upon by the actuating member in dependence upon displacement thereof and connected to control supply of operating current to the pump.

4,017,029

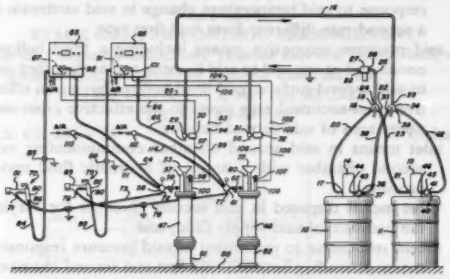
VOLTAGE BLOCK ELECTROSTATIC COATING SYSTEM

Arvid C. Walberg, 708 S. Lombard Ave., Lombard, Ill. 60148

Filed Apr. 21, 1976, Ser. No. 679,025

Int. Cl.² B06B *5/02*

U.S. Cl. 239—15 **10 Claims**



1. In an electrostatic coating system having a spray gun for ejecting highly electrically conductive coating material and an electrode charge to high voltage adjacent the location of ejection of the coating material from the spray gun having a high voltage power supply, and having a coating material supply system supplying coating material to the gun, wherein the improvement comprises,

a first sub-system in said coating material supply system containing coating material electrically grounded,

a second sub-system in said coating material supply system containing coating material insulated from electrical ground and connected to said high voltage power supply,

means for ejecting a stream of coating material into the atmosphere forming a portion of said first sub-system,

means for receiving said stream of coating material as it is ejected across a predetermined air space forming a portion of said second sub-system, said air space having a sufficiently large predetermined dimension between said first and second means to prevent arcing in said air space when said second system is charged to a high voltage by said high voltage power supply, and

control means connected to said ejecting means to prevent ejection of said stream when said high voltage power supply is charging said second sub-system to a high voltage.

4,017,030

DEVICES FOR CONTROLLED RELEASE OF VAPORS

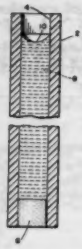
Myron J. Coplan, Natick, and Thomas W. Brooks, Medway, both of Mass., assignors to Albany International Corporation, Dedham, Mass.

Continuation-in-part of Ser. No. 519,603, Oct. 31, 1974, abandoned. This application Sept. 26, 1975, Ser. No. 617,261

Int. Cl.² A61L *9/04;* **A24F** *25/00*

U.S. Cl. 239—44 **40 Claims**

1. A device for dissemination of a vaporizable material at a predetermined rate by vapor diffusion through a stagnant gas layer comprising a elongated capillary conduit of predetermined cross-sectional area and length having one closed end, and a vaporizable substance contained in said conduit, said



stangnant gas layer overlaying the vaporizable substance in the conduit.

4,017,031

MINIATURE ATOMIZER OF MANUAL TYPE

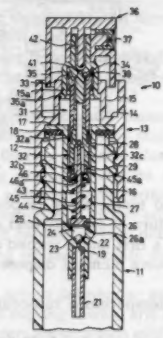
Takao Kishi, and Takamitsu Nozawa, both of Tokyo, Japan, assignors to Yoshino Kogyosho Co., Ltd., Tokyo, Japan

Filed Sept. 25, 1975, Ser. No. 616,884

Claims priority, application Japan, Sept. 26, 1974, 49-116183[U]

Int. Cl.² B05B *9/043;* **G01F** *11/36*

U.S. Cl. 239—333 **6 Claims**

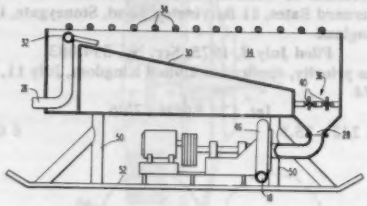


1. A liquid spraying device comprising a container for liquid, including an axially perforated cap, spray means including a nozzle associated with said container and including reciprocable means extending through said cap, first pressure chamber means depending beneath said cap, second pressure chamber means in axial alignment with said first pressure chamber means and positioned above said cap, said reciprocable means including a first piston member in the first pressure chamber means and a second piston member in said second pressure chamber means and further including first valve means, said valve means being arranged to control liquid flow from said second pressure chamber to the nozzle of said spray means, spring means arranged to maintain said first valve means in a closed condition to prevent inadvertent emission of liquid therefrom, second valve means in said first pressure chamber means, liquid carrying means depending from said last-named means and extending into said container, further characterized by said first pressure chamber means including spaced upper and lower vent means, said first piston member including plural axially spaced upper and lower skirt means adapted to open and close said plural vent means upon reciprocation of said spray means.

4,017,032
FORMATION AND TRANSPORTATION OF SLURRIED UNCONSOLIDATED OVERBURDEN

Keith E. Dyas, Bagdad, Ariz., assignor to Cyprus Mines Corporation, Los Angeles, Calif.

Filed Aug. 7, 1975, Ser. No. 602,575
Int. Cl.² B02C *23/36*
U.S. Cl. 241—15 9 Claims



9. The method of disintegrating and slurrying unconsolidated overburden for transport from a region of sub-surface exploitation to a depositing area, comprising the steps of:

a. providing a hopper having upstanding sidewalls, an inclined bottom surface, and an opening adjacent the lowermost portion of the bottom surface;

b. providing a first, coarse grillwork across the top of the hopper;

c. providing a plurality of rotatable toothed rollers in said opening;

d. providing a second, fine grillwork in said opening, said grillwork comprising a plurality of horizontal members extending between the paths of the teeth of the rollers;

e. discharging overburden through said first grillwork and onto said inclined bottom surface;

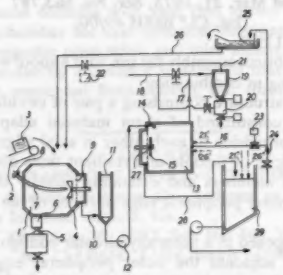
f. directing a stream of pressurized water directly upon the unslurried overburden to disintegrate the overburden and to urge the disintegrated overburden downwardly along the bottom surface to the second grillwork; and

g. rotating said toothed rollers between the horizontal members of the second grillwork to comminute the overburden urged thereupon.

4,017,033
APPARATUS AND METHOD FOR RECLAIMING WASTE PAPERS

Josef Trä, Heidenheim, Germany, assignor to J. M. Voith GmbH, Heidenheim (Brenz), Germany

Filed Mar. 25, 1976, Ser. No. 670,353
Claims priority, application Germany, Mar. 29, 1975, 2514162
Int. Cl.² B02C *23/38*
U.S. Cl. 241—28 15 Claims



1. Apparatus for processing contaminated waste paper into a cellulosic fibrous pulp, which comprises;

a slusher for slushing said waste paper;

a pressure-operated fiberizer for liberating fibers from slushed waste paper, said fiberizer being adapted to continuously separate liberated fiber, light waste paper contaminants mixed with fibrous cellulosic material and heavy waste paper contaminants mixed with fibrous cellulosic material;

means connected to said slusher, for delivering waste paper slush produced in said slusher to said fiberizer;

means for separating liberated fiber substantially free of contaminants, from said fiberizer;

means for receiving the separated, liberated fiber;

a centrifugal separator adapted to separate heavy waste paper contaminants from mixtures thereof with fibrous cellulosic materials;

means communicating between said fiberizer and said centrifugal separator for conveying the separated heavy waste paper contaminants mixed with fibrous cellulose material in pressurized condition directly from said fiberizer to said centrifugal separator;

means for recycling fibrous cellulosic materials separated in said centrifugal separator, to said means for receiving the separated, liberated fiber;

a separator adapted to separate light waste paper contaminants from mixtures thereof with fibrous cellulosic materials;

means communicating between said fiberizer and said separator adapted to separate light waste paper contaminants, for conveying said mixtures of light waste paper contaminants with fibrous cellulosic materials from said fiberizer to said separator adapted to separate light waste paper contaminants; and

means for recycling fibrous cellulosic materials separated in said separator adapted to separate light waste paper contaminants, to said means for receiving the separated, liberated fiber.

15. A method of continuously processing contaminated waste paper into a usable cellulosic fiber pulp, which comprises

A. slushing the contaminated waste paper with water;

B. continuously making a first separation of gross contaminants from the slushed waste paper;

c. continuously liberating cellulosic fibers from the slushed waste paper separated in said first separation, whereby a mixture is obtained which comprises light contaminants, heavy contaminants and liberated cellulosic fibers;

D. continuously separating said mixture at a first location into

1. A substantially contaminant free cellulosic fiber pulp;

2. a mixture of light contaminants with fibrous cellulosic material; and

3. a pressurized mixture of heavy contaminants with fibrous cellulosic material;

E. separating the light contaminants from the mixture (2) above;

F. conveying the pressurized mixture (3) above from said first location directly to a second location;

G. continuously separating the heavy contaminants from the mixture (3) above at said second location; and

H. continuously mixing the fibrous cellulosic material obtained in at least one of the steps (E) and (G) with the slushed waste paper.

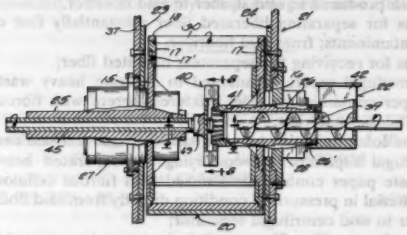
4,017,034
ART OF DRY MILLING SORGHUM AND OTHER CEREAL GRAINS

Edwin Griffith, Dodge City, Kans., and Edward S. Stickley, Milwaukee, Wis., assignors to Krause Milling Company, Milwaukee, Wis.

Filed Apr. 12, 1976, Ser. No. 676,017
Int. Cl.² B02C *13/09*
U.S. Cl. 241—74 16 Claims

1. In milling apparatus having an outer housing, having a cylindrical stator supported in said outer housing, said stator

having a perforated peripheral wall and there being an outer space between said outer housing and stator from which grain particles are adapted to be discharged, having a rotor and having means supporting said rotor for rotation on a horizontal axis within said stator, there being a milling space between said rotor and stator, and there being cooperating means on



the interior of the peripheral wall of the stator and the exterior of the rotor for performing concomitant decortication and degermination in said milling space, the improvement comprising having the rotor hollow and provided with openings in its periphery communicating with said milling space, and means for feeding grain into the interior of said hollow rotor to be discharged from said rotor openings into said milling space.

4,017,035

IMPACT CRUSHER WITH ADJUSTABLE IMPACT OR GRINDING MEANS

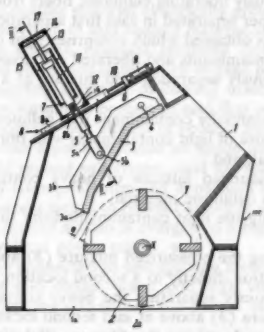
Jürgen Stuttmann, Munster, Germany, assignor to Hazemag Dr. E. Andreas KG, Munster, Germany

Filed July 24, 1975, Ser. No. 598,881

Claims priority, application Germany, July 27, 1974, 2436337

Int. Cl.² B02C *13/06*

U.S. Cl. 241—189 R **11 Claims**



1. In an impact crusher, a combination comprising a housing having an inlet for material to be comminuted and an outlet for comminuted material; a rotor provided with beaters and mounted in said housing; an impact or grinding means mounted in said housing for movement toward and away from said rotor and defining therewith a gap through which the material to be comminuted passes on its way from said inlet toward said outlet and is comminuted by said rotor beaters and said impact or grinding means; and adjusting means for varying the width of said gap, having a lost motion to allow the impact or grinding means to yield in direction away from said rotor and including carrier means connected with said impact or grinding means and extending from said housing, holder means connected with said carrier means outside of said housing, motor means operable to move said holder means at least in a direction to increase the width of said gap, and at least one insert mounted at the other side of said housing and having portions of different thicknesses, said insert being movable between said holder means and said housing to thereby determine the minimum width of said gap depending on the thickness of that portion of said insert which is located between said housing and said holder means.

4,017,036

CONTROL OF THE LINEAR SPEED OF THE WEB

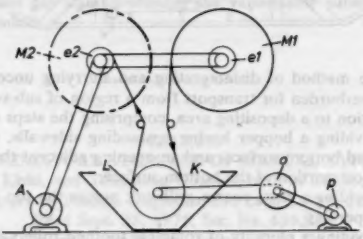
Emile Bernard Bates, 11 Barrington Road, Stoneygate, Leicester, England

Filed July 8, 1975, Ser. No. 594,083

Claims priority, application United Kingdom, July 11, 1974, 30691/74

Int. Cl.² B65H *17/06*

U.S. Cl. 242—75.5 **6 Claims**



1. Apparatus for controlling the linear speed of a web travelling from a supply to a take-up, comprising drive means for advancing the web from said supply to said take-up; sensing means for sensing the actual speed of the advancing web; comparing means for making a comparison of the sensed actual speed with a reference speed, including a first shaft which is adapted to rotate in dependence upon the actual speed of the web, a second shaft, a synchronous motor rotating said second shaft at said reference speed and in the same direction as said first shaft, and means for determining relative angular displacement of said shafts including a disk on each of said shafts and rotatable therewith, a first electrical contact on one and a pair of second electrical contacts on the other of said disks, said first contact being arranged to engage one of said second contacts in response to relative circumferential displacement of said disks; and adjusting means for adjusting the operation of said drive means in accordance with the engagement of said first contact with either of said second contacts.

4,017,037

TENSION BRUSH FOR WIRE SPOOL

Joseph J. Kovaleski, c/o Wyrepak Industries Inc., 136 James St., Bridgeport, Conn. 06604

Filed Mar. 31, 1975, Ser. No. 563,787

Int. Cl.² B65H *49/00*

U.S. Cl. 242—129.8 **9 Claims**

1. A tension brush assembly for use with a spool wound with wire, comprising in combination:

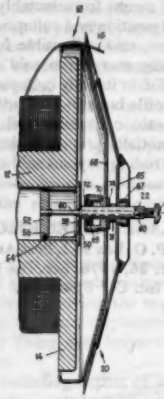
a. a support structure comprising a pair of circular disklike members constituted of sheet material adapted to be disposed broadside to each other in axial alignment,

b. a multiplicity of flexible and resilient tines disposed between the members and extending radially thereof beyond the outer peripheral edge portions of the members, and

c. means disposed in a generally circular configuration and extending adjacent the outer peripheral edges of the members, for securing the same together to clamp inner end portions of the tines therebetween,

d. the outer ends of the tines being free and unattached, and said structure having means adapted to mount it at one end of a spool,

e. said tines being constituted of heat-softenable material, all portions of said tines being disposed radially, and the



adjoining inner end portions of the tines being integrally secured to each other solely by being heat-fused together.

4,017,038

TENSIONING DEVICE FOR TRAVELING YARNS AND THE LIKE

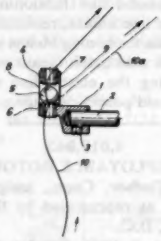
Horst Paepke, Fasanenweg 30, 7470 Rottenburg, N., Germany

Filed Mar. 26, 1975, Ser. No. 562,242

Claims priority, application Germany, Mar. 14, 1975, 2511162

Int. Cl.² B65H *59/22*

U.S. Cl. 242—152.1 **7 Claims**



1. A tensioning device for traveling yarns and the like, comprising first means forming a yarn passage having an inlet and an outlet; a spherical member straddling said outlet to control the tension of a yarn traveling through said passage; second means defining with said first means at said outlet thereof a chamber for said spherical member which has at least two opposite open sides; and third means spaced axially from said outlet by a distance so selected that said spherical member is prevented from moving out through said open sides.

4,017,039

VEHICLE TRANSPORT PIPELINE PUMPING SYSTEM

Marion R. Carstens, Atlanta, Ga., assignor to Georgia Tech Research Institute, Altanta, Ga.

Filed Jan. 30, 1975, Ser. No. 545,339

Int. Cl.² B65G *51/04*; B61B *13/00*

U.S. Cl. 243—6 **31 Claims**

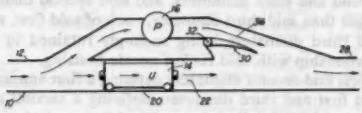
1. A transportation system comprising, in combination:

conduit means defining a path for vehicular movement therewithin and having a generally uniform cross-sectional shape of generally constant area;

a wheeled vehicle in said conduit means having a cross-sectional shape similar to but of smaller area than that of said conduit means, said vehicle presenting a high coefficient of drag with respect to air flowing through said conduit means past said vehicle;

pump means for creating a flow of air through said conduit means at a selected mass rate of flow sufficient to sweep said vehicle along said path;

said conduit means including a section having parallel branches, one of which branches defines a passage constituting a portion of said path along which the vehicle moves and the other of which branches defines an air



by-pass for said passage, said other branch being overhead with respect to said one branch and joining same at a small angle;

said pump means including a pump in said by-pass defined by said other branch and operating to divert the full flow of system air around said passage; and

control means at the confluence of said branches, said control means including a plate pivotally suspended about an axis within said other branch transverse to said passage and normally hanging downwardly to engage the top of said passage at said confluence whereby to block said passage and prevent reverse air flow through said passage.

4,017,040

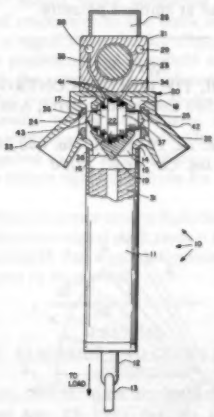
STEERABLE EXTRACTION ROCKET

Robert B. Dillinger, Ridgecrest, and W. James Stone, China Lake, both of Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Jan. 12, 1976, Ser. No. 648,557

Int. Cl.² F41G *7/00*

U.S. Cl. 244—3.22 **8 Claims**



1. A rocket motor for towing a load along a flight trajectory away from an aircraft, comprising:

an elongated casing having first and second ends, a longitudinal axis, and having tow means fastened at said first end;

a propellant charge contained within said elongated casing for generating a high pressure gas;

a rocket nozzle housing rigidly attached to one end of said elongated casing, said rocket nozzle housing defining a plurality of apertures therethrough forming opposed rocket nozzle pairs for creating thrust by exhausting said high pressure gas from said elongated casing;

rocket nozzle closure means controlling each of said opposed rocket nozzle pairs of varying the rate of gas flow through each of said nozzles;

said rocket nozzle closure means having first and second opposed conical ends spaced from a stepped cylindrical center section, said center section defining first, second, and third diameters wherein said first diameter is larger than said second diameter and is located between said second and third diameters, and said second diameter is larger than said third diameter, each of said first, second, and third diameters being sealingly retained in sliding relationship with said rocket nozzle housing;

said first and second diameters defining a first annular face; said first and third diameters defining a second annular face; said second diameter and said first conical end being spaced apart to define a first cylindrical region having a diameter which is smaller than said third diameter, and a third annular face; said third diameter and said second conical end being spaced apart to define a second cylindrical region having a diameter equal to the diameter of said first cylindrical region, and a fourth annular face; said third and fourth annular faces, first and second cylindrical regions, and first and second conical ends all being exposed to said high pressure gas when said propellant charge is ignited;

said housing, first and second diameters, and first annular face defining a first volume; said housing, first and third diameters and second annular face defining a second volume; said first and second opposed conical ends being positioned to alternately open and close two of said rocket nozzles by reciprocative sliding motion of said rocket nozzle closure means therebetween;

sensing means for generating signals in response to the motion of said rocket motor; and

control means connected to said sensing means and operatively connected to said rocket nozzle closure means for selectively operating said closure means in response to signals from said sensing means;

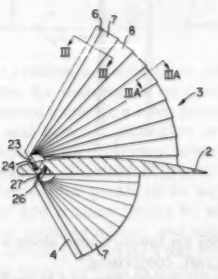
said control means being operable to selectively supply said high pressure gas to said second volume, said first volume being maintained at ambient pressure.

4,017,041

AIRFOIL TIP VORTEX CONTROL

Wilbur C. Nelson, 1540 Cedar Bend Drive, Ann Arbor, Mich. 48103

Filed Jan. 12, 1976, Ser. No. 648,247
Int. Cl.² B64C *23/00*
U.S. Cl. 244—40 R **23 Claims**



22. For an airfoil of an aircraft having a longitudinal centerline, wherein the airfoil includes an upper surface, a bottom surface and an end, the improvement comprising:

a collapsible foil oriented substantially perpendicular to one said surface of said airfoil at least adjacent said end thereof and aligned at least approximately parallel to the longitudinal centerline of said aircraft; and

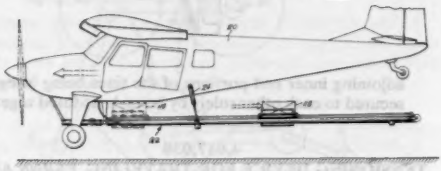
controllable power means for selectably extending said foil into an extended position and collapsing said foil to a fully collapsed position, said collapsible foil in said extended position projecting away from said one airfoil surface, said collapsible foil in its fully collapsed position presenting a covered profile but still protruding beyond said one airfoil surface, said collapsible foil in all its positions remaining substantially perpendicular to said one airfoil surface and protruding beyond said one airfoil surface.

4,017,042

AIRPLANE PARCEL EJECTOR

Darwin J. Jacobson, P. O. Box 962, Port Angeles, Wash. 98362

Filed Apr. 26, 1976, Ser. No. 680,064
Int. Cl.² B64D *1/02*
U.S. Cl. 244—137 R **15 Claims**



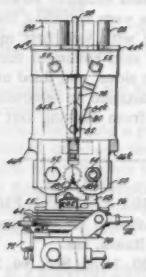
1. An airplane parcel ejector mechanism comprising frame means adapted to be secured to, carried by, and to extend longitudinally of the underside of an airplane; a parcel carriage mounted for travelaing movement longitudinally of said frame means; a plurality of longitudinally spaced sheave means; elastic line means having one end portion thereof connected with the airplane, being reeved about said sheave means, and having the other end portion thereof connected with said carriage; elastic line tensioning means providing tension in said elastic line means; releasable catch means for holding said elastic line tensioning means while under tension; and release means for said catch means providing for release thereof and permitting the elastic line means to impart a propelling force on said parcel carriage.

4,017,043

DEPLOYABLE ROTOR

Justin J. Barzda, Windsor, Conn., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Mar. 8, 1976, Ser. No. 664,714
Int. Cl.² B64D *19/02*
U.S. Cl. 244—138 A **7 Claims**



1. A preconing device for a deployable rotor having a pair of parallelly folded rotor blades mounted on a rotor hub for movement between stowed and flight positions, comprising, in combination:

drag means for producing a force opposite to the direction of flight;

a lanyard having a shank connected to said drag means for moving in the direction of said force, said lanyard forming a fork having a pair of parallelly spaced prongs connected together at respective one ends to form said shank and having a pair of concentric holes formed in each of the respective other ends;

a slide having a shank formed to be connected to the rotor hub for movement therewith, said slide forming a fork having a pair of parallelly spaced prongs formed to slidably register therebetween with said lanyard prongs, said slide prongs having a pair of identically aligned slots formed along the respective lengths thereof and connected together at respective one ends to form said shank;

guide means having an elongated member passing through the holes in said lanyard and simultaneously engaging the slots of said slide for limiting the motion of said lanyard within said slide to linear displacement along said slots and for slidably fixing said lanyard prongs within said slide prongs; and

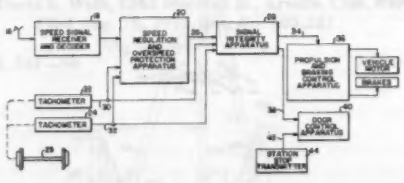
spreading means including a pair of links releasably connected at respective one ends to corresponding ones of the rotor blades and rotatably connected at the respective other ends to said guide means elongated member intermediate said lanyard prongs for urging said one ends of said links along said slots upon application of said drag means force and for concomittantly spreading said other ends of said links to precone the folded rotor blades.

4,017,044

TRAIN VEHICLE CONTROL APPARATUS

Larry W. Anderson, and Michael P. McDonald, both of Pittsburgh, Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Aug. 6, 1975, Ser. No. 602,491
Int. Cl.² B61L *3/24*
U.S. Cl. 246—182 B **8 Claims**



1. In control apparatus responsive to the movement of a train vehicle, the combination of:

means operative with said train vehicle for providing a first speed signal having a first polarity when said train vehicle is moving in a predetermined direction at a speed greater than a predetermined zero speed and having a second polarity when said train vehicle is not moving in said direction at greater than said predetermined zero speed,

means operative with said train vehicle for providing a second speed signal having said first polarity when said train vehicle is moving at a speed greater than said predetermined zero speed and having said second polarity when said train vehicle is not moving at greater than said predetermined zero speed, and

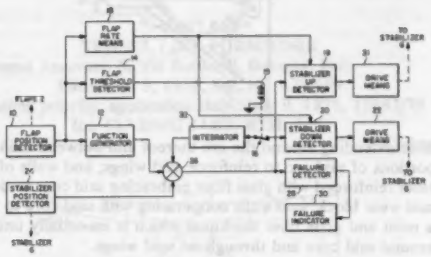
means for providing a vehicle control signal in response to each of said first speed signal and said second speed signal having said first polarity.

4,017,045

FLAP COMPENSATION SYSTEM FOR USE WHEN CONTROLLING THE PITCH ATTITUDE OF AN AIRCRAFT

Albert T. Kirchhein, Montvale, N.J., assignor to The Bendix Corporation, Teterboro, N.J.

Filed Dec. 24, 1975, Ser. No. 644,217
Int. Cl.² G05D *1/00*
U.S. Cl. 244—194 **4 Claims**



1. Apparatus for controlling the pitch attitude of an aircraft through aircraft flaps and a horizontal stabilizer of the aircraft, comprising:

means for providing a signal corresponding to the pilot effected rate of displacement of the flaps;

detector means connected to the flap displacement rate signal means and responsive to the signal therefrom for providing a signal when the flap displacement rate signal exceeds a predetermined threshold;

means connected to the detector means and coupled to the horizontal stabilizer and responsive to the signal from the detector means for displacing the stabilizer;

means for providing a signal corresponding to the displacement of the flaps;

means for providing a signal corresponding to the displacement of the horizontal stabilizer;

means for combining the flap displacement signal and the stabilizer displacement signal and for providing a stabilizer displacement error signal having a sense in accordance with the sense of the displacement of the flaps;

the detector means being connected to the combining means and responsive to the error signal therefrom for providing a signal when the flap displacement rate signal exceeds a predetermined threshold in a sense in accordance with the sense of the displacement of the flaps;

other detector means connected to the combining means and responsive to the error signal therefrom above a predetermined threshold for providing a failure signal;

means connected to the other detector means and responsive to the failure signal therefrom for indicating a failure; and

the other failure detector means includes time delay means whereby the error signal must remain above the predetermined threshold for a predetermined interval for the failure signal to be provided.

4,017,046

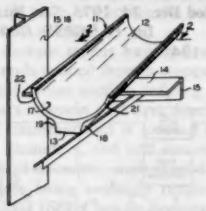
SUPPORTING, ALIGNING AND COUPLING DEVICE FOR PIPES

Chester F. Hicks, 203 N. Main St., Walbridge, Ohio 43465

Filed Apr. 25, 1975, Ser. No. 571,544
Int. Cl.² F16L *3/16*
U.S. Cl. 248—55 **6 Claims**

1. A pipe saddle comprising a unitary structure formed of a continuous body of glass fiber reinforced resin including a cradle in the form of a segment of a right-circular cylinder of glass fiber reinforced resin; a wear block having a broad flat bottom surface extending parallel to the cylindrical axis of the cradle over a substantial portion of its length and integral with

said cradle; a core of material other than said resin conformed to the external shape of said wear block and contiguous cradle portion; wings of said cradle extending beyond said wear block as portions of said segment of a cylinder wherein said cradle segment includes a continuous layer of woven glass



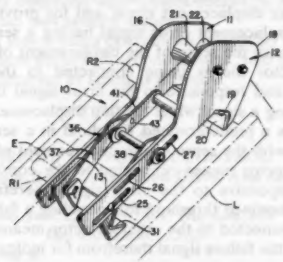
fiber extending around the arc thereof and between the distal portions of said arc to reinforce said wings; and walls of said resin reinforced with glass fiber embracing said core to define said wear block, said walls cooperating with said core to form a resin and glass fiber thickness which is essentially uniform around said core and throughout said wings.

4,017,047

QUICK-RELEASE ROLLER ATTACHMENT FOR SUPPORTING A ROPE OR HOSE AND THE LIKE ON AN AERIAL LADDER

Glenn F. Brogdon, Jr., Manassas, and Algar H. Cosby, Chantilly, both of Va., assignors to C. T. Inc., Manassas, Va.

Filed May 21, 1976, Ser. No. 688,580
Int. Cl.² H02G *3/04*
U.S. Cl. 248—55 **8 Claims**



1. A quick-connect and quick-disconnect roller attachment for supporting a rope or hose and the like on an aerial ladder and the like, comprises: a pair of substantially identical, flat, parallel side plates; roller means connected at opposite ends thereof to the side plates and extending transversely therebetween for supporting a rope or hose and the like; first rung-engaging channel means carried by the side plates at one of their ends and extending transversely therebetween in a position to engage a rung of a ladder; second rung engaging channel means movably carried by the side plates at their other ends and extending transversely therebetween in opposed relation to said first rung-engaging channel means for engaging another rung of a ladder to secure the attachment to a ladder; and linkage means carried by the side plates and connected to the second rung-engaging channel means for selectively moving the second rung-engaging channel means into and out of operative engagement with a pair of spaced rungs of a ladder, said linkage means including an overcenter mechanism to latch the attachment in rung engaging position.

4,017,048

METHOD OF FORMING A PUSH PIN ARTICLE AND ARTICLES PRODUCED BY THE METHOD

Ruediger Einhorn, Katonah, N.Y., assignor to Coats & Clark Inc., Stamford, Conn.

Division of Ser. No. 489,051, July 16, 1974, Pat. No. 3,911,516. This application July 23, 1975, Ser. No. 598,372
Int. Cl.² A47G *1/16*
U.S. Cl. 248—216.1 **20 Claims**

1. A push pin hanger for supporting an object on a supporting surface comprising a rigid base having first and second opposite surfaces, said first surface conforming to said supporting surface, a first pin rigidly mounted in said base and extending from said first surface at an acute angle thereto in a plane normal to said first surface, and a second pin rigidly mounted in said base and extending from said second surface in said plane at an acute angle to said first surface, whereby the direction of extension of said second pin intersects said first surface at a point spaced from said first pin, the ends of said first and second pins away from said base being directed in opposite directions with respect to said base and being pointed for insertion in said supporting surface and said object respectively.

4,017,049

EASEL

Percy Frederick Albee, Jr., Barrington, R.I., assignor to Q-Panel Company, Providence, R.I.

Filed May 22, 1972, Ser. No. 255,561
Int. Cl.² A47B *97/04*
U.S. Cl. 248—464 **5 Claims**

4. An easel comprising

a. at least three sleeves,

b. means pivotally securing said sleeves together at one of their ends to form the top of the easel,

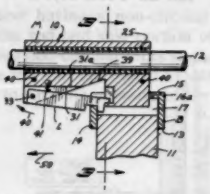
c. a leg telescopically mounted in each of said sleeves,

d. pad holder means having at least two units, each unit being formed with an outwardly extending arm member, a pair of legs extending angularly upwardly from the sides of the arm member beyond said sleeve to form a channel between the legs in which said sleeve is located and means beyond said sleeve closing the open end of the channel whereby an opening is formed which slidably receives the sleeve upon which the pad holder units travel when their height is adjusted upwardly or downwardly.

4,017,050
FISHING ROD HOLDER APPARATUS

Gordon G. Rosenau, 400-7th Ave. NW., Waseca, Minn. 56093

Filed Aug. 7, 1975, Ser. No. 602,584
Int. Cl.² A01K 97/10
U.S. Cl. 248—534 5 Claims

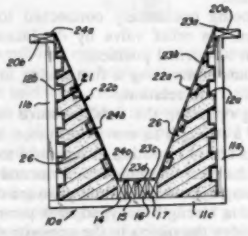


1. Apparatus for releasably mounting a fishing rod on a wall portion of a boat comprising a mounting bracket mountable on the boat wall portion and a fishing rod mount having a rod mounting portion and a foot portion, said bracket having a foot portion slot and said foot portion having first means extendable into said slot for supporting the holder on the bracket, said bracket and foot portion having cooperating means for releasably locking the mount to the bracket when said first means is extended into said slot, the foot portion cooperating means including a fishing rod mount that is slidably extendable into said slot, a latch having a first end portion and a second end portion, said first end portion having means for latchingly engaging the bracket, means for mounting the latch on the fishing rod mount for pivotal movement between a latching position and a release position, and means for resiliently urging the latch to its latching position, the fishing rod mount having stop means abuttable against the latch for limiting the pivotal movement of the latch from its release position toward the latching position to the latching position, the bracket cooperating means including a bracket wall portion adjacent the slot and the first end portion means comprising latch edge portions defining a latch slot of a size for the last mentioned wall portion to extend into, one of said latch edge portions in the latch latching position being abuttable against said wall portion to lock the mount to the bracket.

4,017,051
LIGHTWEIGHT CONCRETE BEAM FORM

Samuel C. Scott, Rte. 1, Box 369, Franktown, Colo. 80116, and David R. Wells, 6862 Marshall St., Arvada, Colo. 80003

Filed Aug. 18, 1975, Ser. No. 605,321
Int. Cl.² E04G 13/04
U.S. Cl. 249—50 7 Claims



1. A rigid, lightweight beam form for molding long concrete beams comprising:

a. a plurality of U-shaped members spaced apart;

b. a pair of opposed corrugated metal sheets secured to the insides of the legs of said U-shaped members in generally upright, parallel position;

c. a bottom support assembly secured to the cross members of said U-shaped members and extending the length of the form;

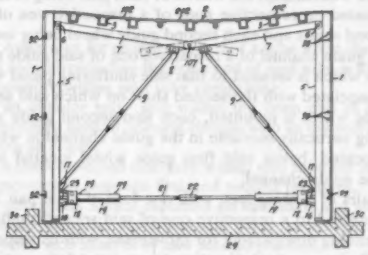
d. non-stick, flexible, but essentially rigid, plastic sheet means extending longitudinally of the form and extending laterally from the top of one of said corrugated metal sheets to the top of the opposite corrugated metal sheet and formed in a general U-shape having the profile of the desired beam; and

e. essentially rigid, foamed plastic filling the space between said non-stick plastic sheet means and said opposed corrugated metal sheets and adhered thereto.

4,017,052
TUNNEL LIKE FORMWORK

Giovanni Azzaroni, 8, Via Botticelli, Bologna, Italy

Filed Nov. 5, 1975, Ser. No. 628,959
Claims priority, application Italy, July 9, 1975, 12692/75
Int. Cl.² E04G 11/02; B28B 7/30
U.S. Cl. 249—183 3 Claims



1. Apparatus providing two laterally spaced, parallel, vertical mold form surfaces and one elevated horizontal mold form surface extending between the upper edges of the vertical mold form surfaces, for use in the casting of concrete, in situ, to form the walls and floors of a building, said apparatus comprising a tunnel-like formwork composed of:

two side shuttering panels each defining a respective one of the vertical mold form surfaces;

a flexible upper shuttering panel composed of two side sections, each fastened to the upper edge of a respective one of said side shuttering panels, and an intermediate, replaceable control section disposed between, and bolted to, said side sections, said two side sections and said intermediate section having upper surfaces defining the horizontal mold form surface; and

a plurality of supporting wheels pivotally mounted to the lower edges of said side shuttering panels and projecting below said side panels for permitting rolling of said apparatus to a work location, and a framework structure disposed inside of said formwork and composed of:

at least two pairs of upright members, with the members of each pair being disposed opposite one another and one member of each pair being fastened to a respective one of said side shuttering panels and being substantially coextensive in height with said side shuttering panels;

at least two pairs of arms, each pair of arms being associated with a respective pair of said upright members, one arm of each pair being pivotally connected at one end to the upper edge of a respective upright member of its associated pair and the two arms of each pair being pivotally connected together at their respective other ends;

a plurality of pairs of inclined struts, each pair being associated with a respective pair of said arms and each strut having an upper end pivotally connected to a respective arm of its associated pair at a point near said other end of its respective arm, each said strut having an adjustable length;

two pairs of parallel, vertical guide members, with each guide member of each pair being secured to a respective one of said side shuttering panels, and each guide member defining a vertical guide channel;

a pair of first shafts each disposed adjacent a respective one of said side shuttering panels and two pairs of first guide wheels, with the guide wheels of each pair being rotatably mounted on respective ends of a respective one of said first shafts and each first guide wheel being located in a guide channel of a respective one of said guide members which is secured to that side shuttering panel which is associated with the shaft on which said guide wheel is mounted, each said guide wheel being vertically movable in the guide channel in which it is located;

a plurality of pairs of sleeves, each pair being associated with a respective pair of said struts and each sleeve being secured to the lower end of a respective strut of its associated pair and being pivotally mounted on a respective shaft of said pair of first shafts;

a pair of second shafts each disposed adjacent a respective one of said side shuttering panels at a location below a respective one of said first shafts and two pairs of second guide wheels, with the wheels of each pair being rotatably mounted on respective ends of a respective one of said second shafts and each second guide wheel being located in a guide channel of a respective one of said guide members which is secured to that side shuttering panel which is associated with the second shaft on which said second guide wheel is mounted, each said second guide wheel being vertically movable in the guide channel in which it is located, below said first guide wheel located in the same guide channel;

two pairs of bearing feet, with one foot of each pair being connected to a respective one of said second shafts and extending downwardly for movement, with its respective shaft, in a vertical direction to an extended position in which said foot projects below said supporting wheels;

power actuated reciprocating means comprising two double acting, fluid driven cylinders extending between said side shuttering panels and each containing a piston and each disposed adjacent a respective associated one of said side shuttering panels, a pair of first piston rods each connected to a respective one of said pistons and extending through one end of its associated cylinder, said rods having their free ends extending toward one another, means connecting said free ends of said first piston rods together while permitting adjustment of the distance between said pistons, a pair of connecting plates each secured to a respective one of said cylinders at the end thereof directed toward its associated side shuttering panel, and a pair of second piston rods each connected to a respective one of said pistons and extending through the end of its associated cylinder to which the respective plate is secured, each said second rod extending through said respective plate;

a pair of first links each having one end pivotally connected to a respective one of said plates and its other end pivotally connected to that respective one of said first shafts associated with the same side shuttering panel;

a pair of second links each having one end pivotally connected to a respective one of said plates and its other end pivotally connected to that respective one of said second shafts associated with the same side shuttering panel; and

a pair of third link means each having one end pivotally connected to the free end of a respective one of said second piston rods and its other end pivotally connected to the associated one of said side shuttering panels;

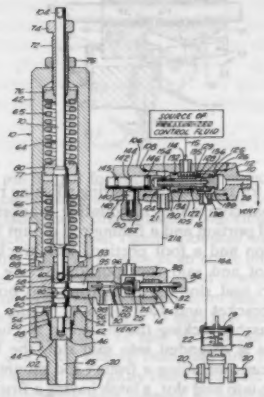
whereby movement of said cylinders away from one another causes simultaneous upward movement of all of said first guide wheels to move all of said struts in a direction to raise all of said arms into a common horizontal plane, downward movement of all of said second guide wheels to move all of said bearing feet into bearing engagement with the underlying surface, and outward movement of said side shuttering panels to stretch said upper shuttering panel in a horizontal plane.

4,017,053

FLUID PRESSURE MONITORING SAFETY SYSTEM

Richard E. Wells, Westminster; Victor E. Derval, Seal Beach, and John D. Muchow, Cerritos, all of Calif., assignors to Willis Oil Tool Co., Long Beach, Calif.

Filed Feb. 6, 1974, Ser. No. 440,165
Int. Cl.² F16K *31/143*
U.S. Cl. 251—58 **7 Claims**



1. A monitor pilot to control an actuator pilot in a control system by venting the actuator pilot in response to pressure changes in a fluid line,

said monitor pilot having in combination:

a body;

a piston in the body exposed to the pressure in the fluid line, said piston having a normal position when the pressure in the fluid line is in a predetermined normal range;

spring means in the body effective to move the piston out of its normal position in response to departure from said normal range of the pressure in the fluid line;

a normally closed relief valve for connection to the actuator pilot to vent the actuator pilot;

a cam movable with the piston;

a longitudinally reciprocable follower cooperative with the cam,

said follower having a normal position at the normal position of the piston and being displaced from its normal position by displacement of the piston from its normal position to cause said follower to be displaced from its normal position,

said follower being operatively connected to said relief valve to open the relief valve by displacement of the follower from its normal position;

said spring means comprising a first spring and a second spring in end-to-end relation;

said first spring opposing the fluid pressure on the piston and being of a strength to move the piston in one direction out of its normal position in response to drop in the pressure on the fluid line below said normal range,

said second spring opposing the fluid pressure on the piston and being of a strength to yield and permit the fluid pressure to move the piston in the opposite direction out of its normal position in response to rise in pressure in the fluid line above said normal range;

said cam being shaped and dimensioned to displace the follower in response to the movement of the piston in either direction out of its normal position;

a rod extending axially from the piston;

said two springs surrounding the rod in axial alignment with each other;

a first seat for the first spring slidably and rotatably embracing the rod;

a bushing in screw threaded engagement with the body and in abutment with the first seat and being rotatable to shift the first seat axially to vary the pressure exerted by the first spring;

a second seat for the second spring slidably embracing a portion of the rod in screw threaded engagement with the body,

said second seat having a non-circular opening for said portion of the rod and said portion of the rod being of corresponding non-circular cross sectional configuration, whereby the rod may be rotated to shift the second valve seat axially to vary the pressure of the second spring.

4,017,054

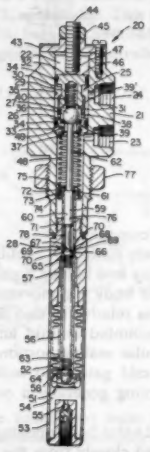
CONDITION RESPONSIVE VALVE CONSTRUCTION

Harley V. Bible, Maryville, and William T. Moon, Jr., Knoxville, both of Tenn., assignors to Robertshaw Controls Company, Richmond, Va.

Division of Ser. No. 516,429, Oct. 21, 1974, Pat. No. 3,937,244. This application Nov. 19, 1975, Ser. No. 633,364

Int. Cl.² F16K *31/126*

U.S. Cl. 251—61.4 **9 Claims**



1. In a condition responsive valve construction having a valve member moved relative to a valve seat to control fluid flow through said valve construction in relation to a condition being sensed by condition responsive means of said valve construction, a plunger forming part of said condition responsive means and being engageable with said valve member to move the same upon movement of said plunger, a tubular member forming part of said condition-responsive means and telescopically receiving a portion of said plunger therein, said condition responsive means having a movable wall operatively associated with said tubular member to move said tubular member relative to said valve seat in relation to said condition being sensed, and means for normally maintaining a certain telescoped relation of said plunger and said tubular member during movement of said tubular member by said wall, the improvement wherein said means for normally maintaining said certain telescoped relation comprises shoulders respectively on said plunger and said tubular member and a spring acting between said tubular member and said plunger to tend to maintain said shoulders in contact with each other.

4,017,055

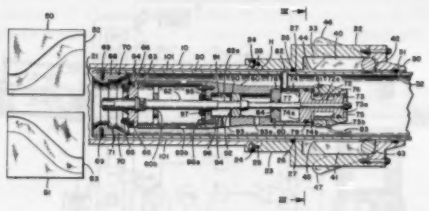
PNEUMATIC VALVE APPARATUS

Calvin C. Daughetee, Arlington, and Sidney Z. Winski, Dallas, both of Tex., assignors to Vought Corporation, Dallas, Tex.

Division of Ser. No. 436,567, Jan. 25, 1974, Pat. No. 3,901,276. This application May 21, 1975, Ser. No. 579,743

Int. Cl.² F16K *31/363*

U.S. Cl. 251—62 **4 Claims**



1. Apparatus for closing the end of a tube when the pressure in an area surrounding the open end of said tube is lower than the pressure within said tube comprising:

a. an annular valve seat within the open end of said tube having a central opening therein with an inwardly projecting shoulder,

b. a shaft mounted coaxially within said tube for reciprocal movement between first and second positions,

c. valve plate means mounted on said shaft and adapted to mate with said valve seat and close the end of said tube when said shaft is in said second position,

d. a double-ended piston mounted on said shaft, said double-ended piston comprising first and second flanges radially extending from said shaft and adapted for reciprocal movement within first and second cylinders, respectively, the diameter of said first cylinder being larger than the diameter of said second cylinder, said first flange and said first cylinder defining a control chamber having a maximum volume when said shaft is in said first position and a minimum volume when said shaft is in said second position, said first flange, said first cylinder, said second flange and said second cylinder defining a variable volume relief chamber having a mimimum volume when said shaft is in said first position and a maximum volume when said shaft is in said second position, and the face of said second flange being exposed to the pressure of the fluid within said tube,

e. relief vent means for maintaining atmospheric pressure within said relief chamber, and

f. control vent means providing fluid communication between said control chamber and said area surrounding the open end of said tube.

4,017,056

SERVO CONTROL SYSTEM FOR ELECTRO-HYDRAULIC INLET VALVES

Thomas H. Schwalenstocker, Indiana Township, Glenshaw, and William E. Zitelli, Middletown Township, Media both of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Feb. 23, 1976, Ser. No. 660,747

Int. Cl.² F16K *31/02*

U.S. Cl. 251—131 **10 Claims**

10. A system for controlling the position of an electro-hydraulically operated valve, comprising

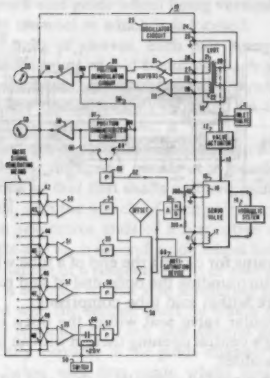
A. a valve;

B. means including a valve actuator operative to position the valve in accordance with the value of an electrical valve position signal;

C. means operative to generate an electrical feedback signal having a characteristic corresponding to the position of the valve;

D. a proportional plus integral controller operative to generate at its output the valve position signal in accordance with the value of the valve control signal and the feedback signal at its input;

E. means to apply an electrical valve control signal to the controller;



F. said means to apply the electrical valve control signal includes a plurality of input terminal pairs, each pair being connectable to said signal, an input buffer having its input connected across each pair of input terminals, and a summing device connected in common to each buffer output to average the signals at the buffer output.

4,017,057

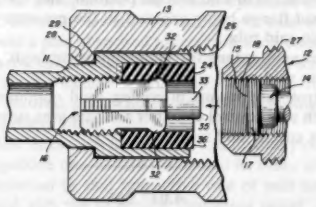
ADJUSTABLE VALVE CORE DEPRESSOR

Richard V. Strybel, Elk Grove Village, Ill., assignor to Imperial-Eastman Corporation, Chicago, Ill.

Filed Apr. 28, 1976, Ser. No. 681,136

Int. Cl.² F16L *37/28*

U.S. Cl. 251—149.1 **14 Claims**



1. In a fluid coupling having a body defining an outer end portion, a through bore opening outwardly through said body outer end portion, a connector having a body defining an inner end portion, a bore opening inwardly through said connector inner end portion, a biased-closed valve in said bore at said connector inner end portion and having an operating element projecting inwardly for opening the valve as an incident of the outward depression of said operating element, and means for removably securing said connector to said coupling body, improved valve depressor means comprising:

means defining a stepped recess in the outer end of said body bore, said recess having an outer portion defining an inner radial shoulder, and a threaded inner portion extending inwardly from said shoulder;

a resilient tubular seal element coaxially in said recess abutting said shoulder; and

a valve operator having an inner threaded end threaded to said body in said threaded inner portion of said body bore, a retainer portion outwardly of said threaded end having a locking portion frictionally radially outwardly engaging said seal element for selectively retaining said depressor in adjusted disposition in said recess, and a depressor portion extending outwardly from said retainer portion in adjusted, fixed disposition for depressing said valve as an incident of connection of said connector to said coupling body in sealing engagement with said seal.

4,017,058

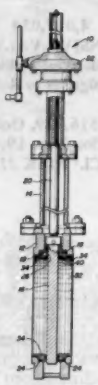
RETAINER FOR SEAT RING ON GATE VALVE

Bert L. Morrison, Houston, Tex., assignor to ACF Industries, Incorporated, New York, N.Y.

Filed Nov. 5, 1975, Ser. No. 628,871

Int. Cl.² F16K *3/02*

U.S. Cl. 251—328 **14 Claims**



5. A gate valve, comprising:

a. a gate valve body having an annular seat pocket around a flow passageway and having a gate movably mounted in said gate valve body for movement between open and closed positions relative to said flow passageway,

b. a seat ring mounted in said annular seat pocket and having an annular sealing portion on one side thereof in contact with said gate, said seat ring having an inner periphery forming generally a continuation of the flow passageway,

c. a recess in said valve body opening into said flow passageway and spaced closely from the seat ring in a direction axially of the flow passageway, and

d. a seat ring retainer having one end portion secured to the inner periphery of said seat ring and extending longitudinally of the flow passageway to said recess, the opposite end portion of said retainer being free and extending outwardly within the recess to retain said seat ring in place in said gate valve body.

4,017,059

DEVICE FOR STRESSING WITH A LIMITED FORCE, IN PARTICULAR FOR A BELT TENSIONER

Gabriel Laine, France, assignor to Automobiles Peugeot, Paris, France

Filed Aug. 12, 1976, Ser. No. 713,976

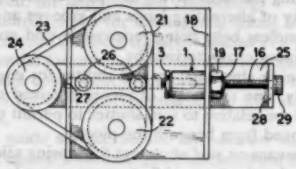
Claims priority, application France, Sept. 11, 1975, 75.27854

Int. Cl.² B66F *3/08*

U.S. Cl. 254—54 **12 Claims**

1. A stressing device for acting on an element which is

movable or adjustable with respect to a fixed support, the device comprising means defining a body for fixing to the support, a screw, a nut and coaxial with and cooperative with the screw, elastically yieldable means adapted to determine the force applied on the element, two abutments integral with



the body the nut being interposed between the abutments, complementary means respectively provided on the nut and a first of said abutments for ensuring a releasable connection between the nut and the first abutment, the elastically yieldable means being disposed between the nut and a second of said abutments.

4,017,060

TUNED VIBRATORY FEEDERS

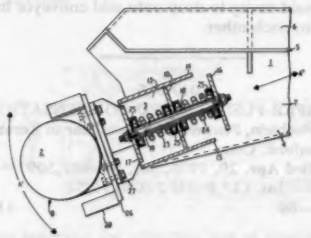
James Edward Brander, and John David Davies, both of Strathfield, Australia, assignors to International Combustion Australia Limited, Australia

Continuation-in-part of Ser. No. 530,472, Dec. 6, 1974, abandoned, which is a continuation-in-part of Ser. No. 308,877, Nov. 22, 1972, abandoned. This application May 28, 1976, Ser. No. 690,741

Claims priority, application Australia, Dec. 9, 1971, 7314/71

Int. Cl.² F16H *33/00*; B65G *27/18*; B01F *11/00*

U.S. Cl. 259—1 R **4 Claims**



1. A vibrator of the tuned two mass type comprising a working member, an imbalance generator of the type having eccentric weights secured to a rotating shaft, and a spring system coupling the imbalance generator to the working member, the spring system comprising a wall member secured to the working member, two vibrator plates held in fixed spaced parallel relationship with one vibrator plate on one side of the wall member and the other vibrator plate on the other side of the wall member, at least two pairs of helical coil springs held without clamping of the spring ends between the wall member and the vibrator plates, one spring of a pair being held between said one vibrator plate and the wall member, and the other spring of a pair being held between said other vibrator plate and the wall member, the springs of a pair being collinear, the imbalance generator being secured to said one vibrator plate outside of the spring system, the vibrator having a natural axial frequency which is close to but higher than the frequency of the oscillatory forces generated by the imbalance generator, the distance by which the imbalance generator is outside the spring system being sufficient to make the natural lateral frequency of the vibrator small compared to the frequency of the oscillatory forces generated by the imbalance generator.

4,017,061

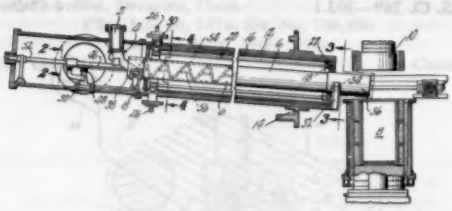
CONVEYOR TUBE FOR A PARTICULATE HEATING FURNACE

Vernon F. Manz, North Palm Beach, and Robert A. Metcalfe, West Palm Beach, both of Fla., assignors to United Technologies Corporation, Hartford, Conn.

Filed Dec. 4, 1975, Ser. No. 637,626

Int. Cl.² C21B *11/06*

U.S. Cl. 266—173 **3 Claims**



1. A furnace for heating particulate material including:
a cylindrical housing,
a cylindrical insulator within and spaced from the housing and end caps with openings therein,
a heater in the form of a plurality of resistance heating rods parallel to the cylindrical insulator and within the insulator and supported from the surrounding cylindrical housing, said rods forming a cylinder located concentrically within the insulator,
a rotary tube concentrically within the heating cylinder for conveying particulate material through the heater, said tube having a helical rib internally for translating material axially through the tube and spaced axially extending ribs internally of the tube to cause tumbling of the material within the tube, said tube extending through the openings in the insulating end caps, and
the several cylinders being positioned at an acute angle to the horizontal to increase the axial rate of travel of the particulate material through a tube.

4,017,062

PRESSURE SPRING

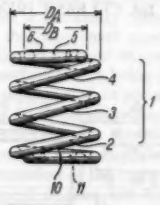
Eckhard Zwirner, Nufringen, Germany, assignor to Stumpp & Schule KG, Beuren, Germany

Filed Sept. 18, 1975, Ser. No. 614,665

Claims priority, application Germany, Sept. 18, 1974, 314151[U]; May 15, 1975, 2521646

Int. Cl.² F16F *1/04*

U.S. Cl. 267—166 **9 Claims**



1. A helical valve spring with a plurality of first windings of a first diameter and at least one second winding with a second diameter, which is different from the first diameter, in which each second winding is provided adjacent to one of the first windings and connected to it by a transitional zone of changing diameter, which spring is in a first condition of operation, in which a valve operatively associated with the valve spring is closed, compressed to a first extent and, in a second condition of operation, in which the operatively associated valve is open,

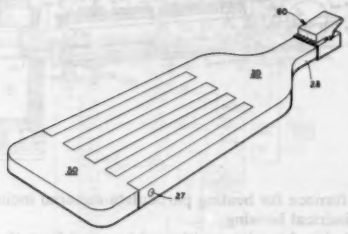
still further compressed to a second extent, characterized in that each transitional zone, at least in the second condition of operation, is in frictional contact over a predetermined area with its respective adjacent winding.

4,017,063

FOOD PROCESSING BOARD

Joseph J. Brusich, 2702 N. Hudlow Court, Tucker, Ga. 30084

Filed Oct. 28, 1975, Ser. No. 626,614
Int. Cl.² A47J *43/00*
U.S. Cl. 269—302.1 **4 Claims**



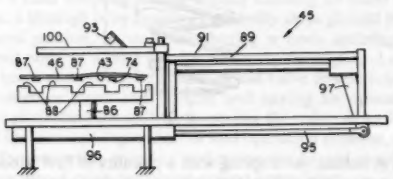
1. An expandable food product processing board comprising a first section including a plurality of elongated parallel projections defining elongated spaces therebetween, a second section including a plurality of elongated parallel projections defining elongated spaces therebetween, with the lengths of the projections of each section being slidably received along the lengths of the spaces of the other section and with the opposite sides of the projections forming opposite flat coplanar surfaces of the processing board, the projections and spaces of each of said sections being of lengths so that the projections of each section substantially fill the spaces of the other section when the sections are moved together, whereby when the sections are expanded apart the projections of each section withdraw from the spaces of the other section and maintain flat working surfaces on opposite surfaces of the processing board, stop means for limiting the distance of the sections can withdraw from each other, and clamp means mounted on one of said sections for holding a food product on said board.

4,017,064

APPARATUS FOR MANUFACTURING AND STACKING HEMMED FABRIC PIECES

Douglas J. Crawford, Waterford; Roger LeMere, Petersburg, and Francis H. Hughes, North Troy, all of N.Y., assignors to Cluett, Peabody & Co., Inc., New York, N.Y.

Division of Ser. No. 344,227, March 23, 1973, Pat. No. 3,898,941. This application Apr. 23, 1975, Ser. No. 570,810
Int. Cl.² B65H *39/06*
U.S. Cl. 270—58 **3 Claims**



1. Apparatus for positioning sequentially on a continuously moving conveyor, two pieces of sheet material together in proper orientation with each other and in a path defined by said continuously moving conveyor, comprising

a. said continuously moving conveyor being a plurality of spaced parallel endless belts;

b. a horizontal first piece receiving shutter movable from a first position spaced vertically above said path to a second position to one side of said path;

c. first power means connected to said shutter for the movement thereof from one position to the other;

d. a staging platform in said path;

e. said staging platform having an upper surface defined by a plurality of alternating lands and grooves and portions of said endless belts being received in said grooves; the improvement characterized by

f. a positioning abutment on said shutter for engaging, sequentially, one side edge of pieces received thereon to hold a piece relative to said shutter to permit the shutter to be moved from beneath the piece;

g. sensing means on said abutment for sensing said received pieces and activating said first power means to cause said shutter to move from said first position to said second position;

h. a second piece receiving cavity in said spaced lands for receiving, sequentially, and holding a second piece to be positioned in relation to a first piece on said shutter;

i. said staging platform being movable vertically in said path from a position with said lands and said cavity above the upper surfaces of said belts to a position with said lands and said cavity below said belts;

j. second power means for moving said staging platform;

k. switch means actuated when said shutter moves to said second position for actuating said first and second power means for causing said shutter to move back to said first position and said platform to move below said conveyor;

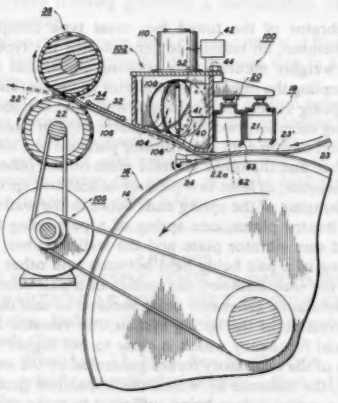
l. whereby positioning a piece against said abutment activates said sensing means to cause said shutter to move from said first position to said second position thereby dropping said piece onto said staging platform, and movement of said shutter to said second position activates said switch means causing said shutter to move back to said first position and said platform to move below said conveyor to cause said positioned first piece and a second piece in said cavity to drop onto said conveyor in proper position to each other.

4,017,065

TRANSFER-FUSING SPEED COMPENSATION

Raymond E. Poehlein, Penfield, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Apr. 29, 1976, Ser. No. 681,309
Int. Cl.² B65H *29/24, 29/54*
U.S. Cl. 271—80 **11 Claims**



1. In a copying system in which an unfused image of imaging material is transferred from a moving initial image support surface means onto one side of a copy sheet while said copy

sheet overlies the initial image support surface and moves therewith, and in which a lead area of the transferred unfused image-bearing copy sheet is then engaged by a moving sheet transport means spaced from the initial image support surface while a trail area of the same copy sheet is still moving with the initial image support surface, with the copy sheet extending therebetween, the improvement comprising:

speed control means for moving said initial image support surface and said sheet transport means at a pre-set speed differential for moving the lead area and the trail area of the same copy sheet at different speeds when said lead area of the copy sheet is engaged by said sheet transport means,

vacuum guide surface means for vacuum supporting the copy sheet against a vacuum guide surface from the side of the copy sheet opposite from the side bearing the transferred unfused image,

said vacuum guide surface means being positioned between said initial image support surface and said sheet transport means for guiding the copy sheet therebetween, and

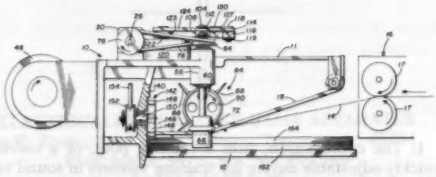
vacuum control means cyclicly actuable for reducing the vacuum applied to said vacuum guide surface in coordination with the extension of the copy sheet between said initial image support surface and said sheet transport means for movement of the copy sheet away from said vacuum guide surface by said pre-set speed differential from said speed control means for speed variation compensation.

4,017,066

SET SEPARATOR

David C. Lasher, Lewisville, Tex., and Kenneth F. Blanchard, Macedon, N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed June 4, 1976, Ser. No. 692,829
Int. Cl.² B65H *29/22, 33/08*
U.S. Cl. 271—80 **4 Claims**



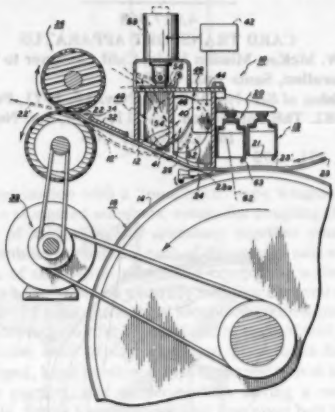
1. A set separator for offsetting sets of sheets comprising: support means having stop means; means for moving a sheet toward said stop means; said sheet moving means including a first pair of paddle wheels rotatably carried by said support means, each of said paddle wheels comprising a main portion having a plurality of circumferentially spaced flexible members extending outwardly therefrom; said paddle wheels being rotatable about aligned axes of rotation; said paddle wheels being in the path of travel of the sheet and being spaced apart a distance less than the dimension of the leading edge of the sheet; means for simultaneously shifting said paddle wheels from a first position, wherein the force exerted thereby on a sheet is in the general direction of movement of the sheet and to one side, to a second position wherein the force exerted thereby is in the general direction of movement of the sheet and to the opposite side, and for simultaneously shifting said paddle wheels back to said first position; means for rotating said paddle wheels in the same direction to move the sheet toward said stop means; said sheet moving means further including a pair of vertical sideposts rotatably supported by said support means and spaced apart in a direction transverse to the direction of sheet travel; said spacing between said posts being greater than the dimension of the leading edge of the sheet; said paddle wheels in said first position urging the side edge of the sheet against one of said posts and when in said second position, directing the opposite side edge of the sheet against the other of said posts; and means for rotating said posts in opposite directions to each other for moving the sheet toward said stop means.

4,017,067

TRANSFER-FUSING SPEED COMPENSATION

Nicholas M. Soures, Penfield; James W. Patterson, Sodus, and Wayne C. Powley, Lyons, all of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed July 20, 1976, Ser. No. 706,996
Int. Cl.² B65H *29/24, 29/54*
U.S. Cl. 271—80 **6 Claims**



1. In a copying system in which an unfused image of imaging material is transferred from a moving initial image support surface means onto one side of a copy sheet while said copy sheet overlies the initial image support surface and moves therewith, and in which a lead area of the transferred unfused image-bearing copy sheet is then engaged by a moving sheet transport means spaced from the initial image support surface while a trail area of the same copy sheet is still moving with the initial image support surface, with the copy sheet extending therebetween, the improvement comprising:

speed control means for moving said initial image support surface and said sheet transport means at a pre-set speed differential for moving the lead area and the trail area of the same copy sheet at different speeds when said lead area of the copy sheet is engaged by said sheet transport means,

vacuum guide surface means for vacuum supporting the copy sheet against a stationary vacuum guide surface from the side of the copy sheet opposite from the side bearing the transferred unfused image,

said vacuum guide surface means being positioned between said initial image support surface and said sheet transport means for guiding the copy sheet therebetween, and

vacuum control means cyclically actuable for reducing the vacuum applied to said vacuum guide surface in coordination with the extension of the copy sheet between said initial image support surface and said sheet transport means for movement of the copy sheet away from said vacuum guide surface by said pre-set speed differential from said speed control means for speed variation compensation;

wherein said vacuum guide surface means comprises at least first and second pneumatically discrete vacuum chambers with respective apertured surfaces providing pneumatically discrete first and second areas of said vacuum guide surface, wherein both of said vacuum chambers are provided with penumatic vacuum from a pneumatic vacuum

generating means and said second vacuum chamber is controlled by said vacuum control means;

wherein said vacuum guide surface first area is adjacent said initial image support surface and vacuum support is maintained therethrough for the copy sheet without substantial reduction by said vacuum control means;

wherein said vacuum guide surface second area is further spaced from said image support surface than said first area and the copy sheet is vacuum retained thereagainst only when said vacuum control means is operative to maintain said vacuum support; and

wherein said vacuum control means comprises an automatically actuated pneumatic valve for rapidly pneumatically venting said one vacuum chamber to atmosphere to rapidly reduce the vacuum therein.

4,017,068

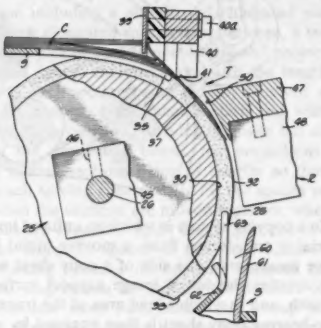
CARD TRANSPORT APPARATUS

James W. McKee, Mission Viejo, Calif., assignor to True Data Corporation, Santa Ana, Calif.

Division of Ser. No. 198,722, Nov. 15, 1971, Pat. No. 3,847,382. This application Nov. 11, 1974, Ser. No. 522,736

Int. Cl.² B65H 5/06

U.S. Cl. 271—275 **9 Claims**



1. In apparatus for handling data cards: a read station, and transport means for moving said cards past said station, said transport means comprising a single card feed roll having a resilient friction surface for moving a card therewith in response to pressure contact of said card with said resilient surface, and pressure applying means for holding said card in pressure contact with said resilient surface, said feed roll having an annular peripheral groove in said resilient surface, and said pressure applying means being located within the extent of said groove axially of said roll, and being spaced from the bottom of the groove whereby said roll is continuously rotatable without contact with said pressure applying means and said pressure applying means is in position to effect transport of a card upon presentation of a card between said resilient surface and said pressure applying means.

4,017,069

DIVING PLATFORM

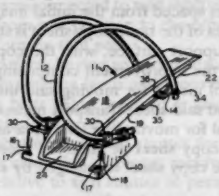
Lewis J. Daly, Fayetteville, and Alan W. Brownlie, Skaneateles, both of N.Y., assignors to Robert C. Stevens, Pottsford and John M. Loftus, Scottsville, both of, N.Y.

Filed Oct. 28, 1975, Ser. No. 626,297

Int. Cl.² A63B 5/10

U.S. Cl. 272—66 **8 Claims**

1. A diving platform comprising a base member, a board member pivotally connected at one end to the base member, a pair of spring arms secured to the base member on opposite sides of the board member, the spring arms extending upwardly and outwardly from the base member and terminating adjacent a position on the board member that is spaced outwardly from its pivotal connection with the base member, and a cross bar connected to the outer, free ends of the spring



arms and passing beneath the board member to support the outer end of same.

4,017,070

TRAINING DEVICE FOR POLE VAULTERS

H. Ronald Hilton, 7 Morningside Drive, Pennington, N.J. 08534

Filed Sept. 29, 1975, Ser. No. 617,622

Int. Cl.² A63B 5/06

U.S. Cl. 272—104 **6 Claims**

1. The combination, with a vaulting pole, of a universal, quickly-adjustable device for training vaulters in sound vaulting techniques and in particular for properly locating the vaulter's hands upon said pole, said device comprising means extending longitudinally of the vaulting pole and formed to deter the vaulter from grasping the pole between the opposite extremities of said means, said means including a pair of collars slidably, removably mounted upon the pole, each collar including means for fixing the same to the pole against movement from a selected position to which the collar is slidably moved therealong, and adjustably extensible elements extending between the collars and carried thereby in positions to deter a user from grasping the pole in the area between the collars.

4,017,071

MACRAME SWING AND METHOD OF FORMING

Jim Wright, Rte. 3, Box 348, Rockingham, N.C. 28379

Filed Feb. 23, 1976, Ser. No. 660,106

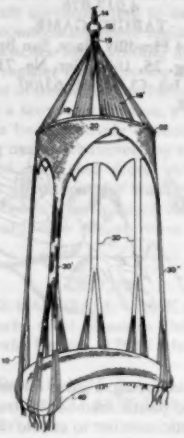
Int. Cl.² A63G 9/00

U.S. Cl. 272—85 **5 Claims**

1. A swing apparatus of the type adapted to carry a human occupant suspended above the ground or floor from a stationary elevated support comprising:

a. an upper support ring and a generally planar, lower seat member spaced from said support ring and having front, rear, and side edges;

b. a plurality of spaced straps connecting spaced points on said ring with spaced points around the sides and rear edges of said seat member, each of said straps being formed of a plurality of cord lengths knotted together according to conventional macrame techniques;



c. the front edge of said seat being void of any straps extending between said front edge and said ring, said ring front edge having a length of at least 16 inches to accommodate a normal occupant; and

d. means connecting said support ring and stationary support for suspending said support ring from said stationary support.

4,017,072

ELECTRICALLY OPERATED GAME APPARATUS

Lynn C. Kurtz, 2104 Campo Alegro, Tempe, Ariz. 85281

Filed July 9, 1975, Ser. No. 594,509

Int. Cl.[2] A63F *9/00*

U.S. Cl. 273—1 E **7 Claims**

1. An electrically operated game played between a first player and a second player, said game comprising, in combination:

a. a play area formed by a plurality of contiguous elements arranged on a matrix having at least two axes, said elements including

i. a plurality of neutral elements; and

ii. a plurality of scoring elements associated with each player, said scoring elements being located among said neutral elements and dispersed across said play area;

b. means for designating one of said contiguous elements;

c. means for incrementally moving the location of said designated element to a contiguous element;

d. means operable by said first player for moving said designated element a single increment along a first axis of the matrix of said play area when said operable means is momentarily operated;

e. means operable by said second player for moving said designated element a single increment along a second axis of the matrix of said play area when said operable means is momentarily operated; and

f. means for indicating a score for one player whenever said designated element is also a scoring element associated with said one player.

4,017,073

HAND COMBAT WEAPON

Douglas B. Dolan, 620 Fairview Ave., Neptune, N.J. 07753

Filed Jan. 5, 1976, Ser. No. 646,662

Int. Cl.[2] F41B *15/02*

U.S. Cl. 273—84 **7 Claims**

1. In combination with a "nunchaku" type weapon having at least two elongated members, means for coupling the adjacent ends of said elongated members together comprising swivel assemblies connecting each of the pairs of said adjacent ends; each of said swivel assemblies comprising a first elongated pivot bolt extending centrally within a first end of each of said pairs of adjacent ends; a second elongated pivot bolt extending centrally within a second end of each of said pairs of adjacent ends; each of said elongated pivot bolts having a rigid, enlarged, head portion; a first U-shaped swivel having a flat center portion, said center portion having a centrally-located hole, fitting loosely about said first pivot bolt beneath its enlarged head portion; a second U-shaped swivel having a flat center portion, said center portion having a centrally-located hole fitting loosely about said second pivot bolt beneath its enlarged head portion; a first clevis pin extending between the opposing sides of said first U-shaped swivel; a first clevis having a lower and an upper portion, said lower portion of said first clevis forming a first loop about said first clevis pin, said upper portion of said first clevis forming a second loop; a second clevis pin extending between the opposing sides of said second U-shaped swivel; a second clevis having a lower portion and an upper portion, said lower portion of said second clevis forming a first loop about said second clevis pin, said upper portion of said second clevis forming a second loop; and means for connecting said second loops of said first and second clevises of each of said pairs of adjacent ends to provide a freely-swivelling coupling between said members.

4,017,074

TABLE BASEBALL GAME

Goodwin N. Roberts, 17 W. 174 Deerpath Road, Bensenville, Ill. 60106

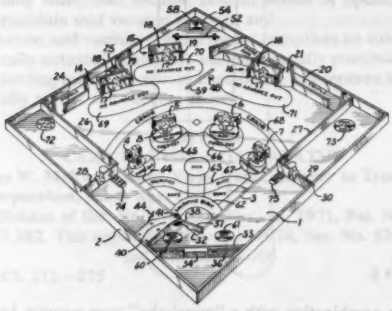
Filed June 23, 1975, Ser. No. 589,331

Int. Cl.[2] A63F *7/06*

U.S. Cl. 273—89 **8 Claims**

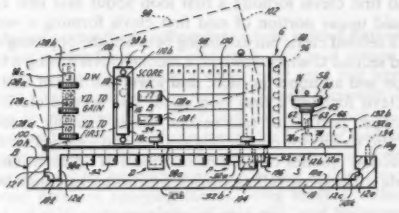
5. Baseball game apparatus comprising a board having a substantially flat upper playing surface with a simulated baseball diamond thereon, a bat mounted for turning on said apparatus adjacent home plate by a first player, a baseball in the form of a disc having a flat surface adapted to slide on the playing surface, a pitching unit in center field operated by a second player to drive said baseball on the playing surface toward said bat, fielder units distributed over the playing field to be struck by batted baseballs, designated areas at various locations on the playing field including locations immediately adjacent some of said fielder units denoting a play assumed to have occurred when said baseball after being batted comes to

rest thereon, wherein, said baseball comprising a thick, weighted disc having a V-groove extending around the circumference of same in the edge thereof, said pitching unit including an elastic member anchored at its ends and adapted to be engaged between its ends in the groove of said baseball, a stop on the board behind said pitching unit, said stop limiting the distance to which the elastic member can be deflected from its normal straight idle position between its ends by said



ball in front of the elastic member when the elastic member is seated in the groove of said ball, said stop including a plate having a long concave ball-engaging edge nearest the elastic member, the edge being in the form of an arc of a circle whose center is on a line that is perpendicular to and that bisects the elastic member when the elastic member is in its idle, straight position, said plate being adjustable away from and toward the elastic member.

4,017,075
SIMULATED FOOTBALL GAME
Sheldon B. Wilson, P.O. Box 3005, Austin, Tex. 78764
Filed Aug. 11, 1975, Ser. No. 603,390
Int. Cl.² A63F 7/06
U.S. Cl. 273—94 R **18 Claims**



1. A game simulating the play of football to be played by at least two opposing players, comprising:

a playing field board simulating a football field having two opposing end zones;

an action sled mounted adjacent said playing field board and movable along the length of said board, said action sled having a first player end and a second player end, each of said first and second player ends respectively opposing one of said end zones;

play selection means mounted adjacent said first and second player ends of said action sled for each opposing player to select their respective types of offensive and defensive simulated football plays;

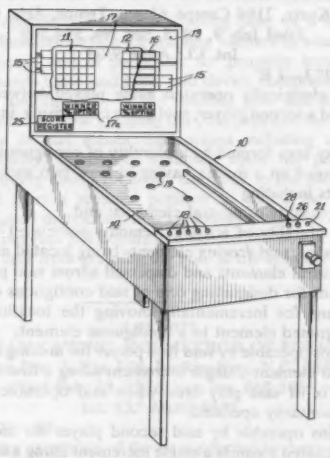
direction selection means mounted adjacent said first and second player ends of said action sled for each opposing player to select the direction of the simulated football play for the respective offensive and defensive maneuverings of each player; and,

random selection means mounted with said action sled for randomly designating a penalty and a non-penalty situation for either of the opposing players during each simulated football play.

4,017,076
TARGET GAME
Henry S. Bai, 421-14 Picadilly Place, San Bruno, Calif. 94066
Filed Aug. 25, 1976, Ser. No. 717,639
Int. Cl.² A63B 63/00
U.S. Cl. 273—102 R **3 Claims**

1. A target game including: a glove formed of a hemispherical dish-shaped rigid plastic member; a strap mounted on the rear side of the plastic member to enable the glove to be held on the palm of the hand of a player; a sheet of fabric material mounted on the glove and extending across the front face of the dish-shaped rigid plastic member to constitute a target for a missile thrown thereagainst, said sheet of fabric material being mounted on the plastic member in spaced relationship with the inner surface thereof so as to present a resilient surface which is deflectible inwardly when struck by the missile.

4,017,077
MATRIX TRANSFORMATION PIN BALL MACHINE WITH SCORE MULTIPLIER OPTION
Walter M. Burnside, Waukegan, Ill., assignor to Bally Manufacturing Corporation, Chicago, Ill.
Filed July 3, 1975, Ser. No. 592,925
Int. Cl.² A63F 7/00
U.S. Cl. 273—121 A **2 Claims**



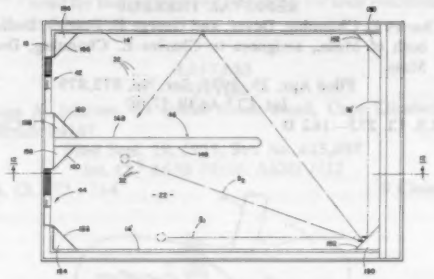
1. In a pin ball game apparatus having a bingo-type matrix, a plurality of game ball switches adapted to be closed by game balls as a result of operation of the game, combinations of said game ball switches adapted to determine a nominal score

award value, search relay contacts connected with said game ball switches, contact wiper means for traversing said search relay contacts to detect active electrical circuit connections, a plurality of search relays each adapted to be actuated by said wiper means when contacting said active circuit connections, relay switches actuated by said search relays for establishing score award circuit corresponding to certain of said active electrical circuit connections, score register means associated with said relay switches for recording any said score award value, said score register means having score register operating means adapted to transmit to said score register means for recording therein a score award value, a score award altering means adapted to be operatively connected with said score register operating means whenever any said score award circuit is established, and said score award altering means adapted to select at random for transmission to said score register means between a score award value greater than said nominal score award value and no score award value.

4,017,078
AIR TABLE HANDBALL GAME APPARATUS

Adolph E. Goldfarb, 4614 Monarca Drive, Tarzana, Calif. 91356, and Erwin Benkoe, 17965 Medley Drive, Encino, Calif. 91316

Filed Dec. 15, 1975, Ser. No. 640,837
Int. Cl.² A63F 3/00
U.S. Cl. 273—126 A **10 Claims**



6. A game apparatus capable of generating an air cushion for supporting a movable playing piece thereon, and for affording fast and generally continuous play action movement of the playing piece, said apparatus comprising:

a. a member having a generally flat upper surface defining a playing surface having a front rebound end and a rear player end, said surface being inclined downwardly from said rebound end toward said player end,

b. means defining a plurality of apertures through said playing surface,

c. means located beneath said member and secured thereto to form an air chamber in communication with said apertures,

d. means operatively associated with and connected to said apparatus for providing air under pressure into said air chamber so that air is emitted through said apertures to provide an air cushion above said playing surface to support a play piece for movement across the playing surface,

e. a pair of opposed side walls extending upwardly from said playing surface, each having a forward end adjacent said front rebound end, a rearward end adjacent said rear player end, and having inwardly presented side rebound surfaces,

f. a front wall extending upwardly from said playing surface and having an inwardly presented front rebound surface,

g. means including said inward side and front rebound surfaces extending around the periphery of said playing surface except for at least a portion of said rear player end,

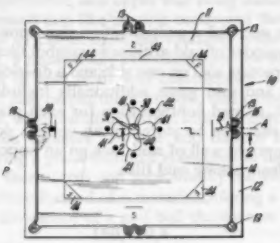
h. an elongated upstanding divider means disposed generally centrally of said playing surface and extending from said rear plays end toward said forward rebound end a portion of the distance between said front and rear ends of the playing surface so as to divide the player end of said playing surface into a pair of transversely spaced player goal areas, said divider means defining a pair of upstanding ouwardly presented side rebound surfaces each spaced opposite the inwardly presented side rebound surface of one of the side walls, and

i. corner bumper means disposed in operative relation to said playing surface and providing a corner rebound surface at the forward end of each of said inward side rebound surfaces and at the rearward end of each of all four of the side rebound surfaces, said corner rebound surfaces extending at an obtuse angle to the side rebound surface adjacent thereto.

4,017,079
TABLE GAME

Norberto Apellaniz, 2360 First Ave., New York, N.Y. 10035

Filed Mar. 17, 1975, Ser. No. 558,903
Int. Cl.² A63F 3/00
U.S. Cl. 273—126 R **10 Claims**



1. A game board comprising a board, side walls extending up from said board, at least one disc, at least one surface of the disc and the surface of the board being adapted to permit the disc to be propelled across the board by the flicking of a finger of a player, said board comprising a plurality of pockets for receiving the disc, and wherein at a side wall there are two pockets adjacent one another and separated by a distance approximately equal to the diameter of the disc in a plane parallel to the plane of the board, further comprising in a first mode of play said board being formed with a recess surface for receiving a propelled disc and in a second mode of play further comprising an insert adapted to fit said recess so as to provide a continuous flat board surface, and in a third mode of play, a second insert adapted to fit into said recess and being formed with a raised portion extending above the board surface and the peripheral surface of the raised portion being adapted to permit a propelled disc to carom from the peripheral surface.

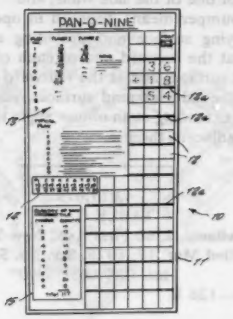
4,017,080
ARITHMETIC BOARD GAME

Richard W. Severson, 2644 Boetcher Road, Waukesha, Wis. 53186

Filed Sept. 17, 1975, Ser. No. 614,067
Int. Cl.² A63F 9/18
U.S. Cl. 273—135 R **1 Claim**

1. In an arithmetic board game, the combination of a pair of playing boards, and a plurality of one hundred and seventeen tiles of numerical value for being placed upon said playing boards, and said game additionally including a plurality of multiplication, division, addition and subtraction symbol tiles for use together with said numerical digit tiles, each of said playing boards comprising a flat panel having a plurality of square spaces imprinted thereupon, said spaces each being of a same size as said tiles, and said spaces being arranged in

horizontal and vertical rows, a double line between each two said horizontal rows of said spaces, said playing board additionally including an example of playing the game for serving as a guide to players, said playing board additionally including a multiplication table imprinted thereupon and also a table indicating a quantity of each numbered tiles, said arithmetic symbol tiles comprising a plurality of yellow tiles having a plus



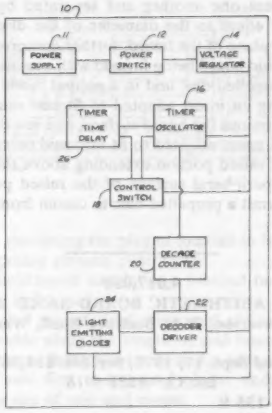
sign on one side and a multiplication sign upon its other side while a remainder of said arithmetic symbol tiles are pink and have a subtraction sign on one side and a division sign upon its other side, and said game additionally including a rack of transverse L-shaped configuration for each player and upon which said tiles can be stored in an upright position hidden behind an upright wall of said rack so an opponent player is prevented from seeing said tiles.

4,017,081

ELECTRONIC RANDOM SELECTION DEVICE AND AMUSEMENT APPLICATION THEREFOR

Anthony J. Windisch, 3882 Walsh St., St. Louis, Mo. 63116

Filed Dec. 29, 1975, Ser. No. 645,206
Int. Cl.² A63B 71/06; A63F 5/00
U.S. Cl. 273—138 A **2 Claims**



1. An electronic random selection device comprising in combination:

a control switch having first and second selectable positions;

first integrated timer circuit means connected for generating a signal oscillating at a first constant rate when the control switch is in the first position;

resistance means connected for causing the first timer circuit means to generate a signal oscillating at a second constant rate, slower than the first rate, when the control switch is in the second position;

second integrated timer circuit means connected for generating a time delay signal to the first timer circuit means when the control switch is in the second position;

integrated decade counter circuit means connected to the first timer circuit means for receiving a signal therefrom and for generating a binary coded decimal count;

integrated decoder/driver circuit means connected to the decade counter circuit means for receiving a signal therefrom and for decoding the signal to a decimal equivalent signal thereof; and

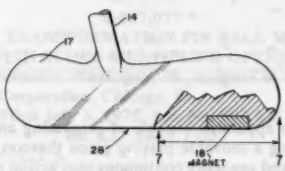
a plurality of light emitting diode means connected to the decoder/driver circuit means for receiving the signal oscillating at the first rate for sequentially illuminating the diodes at a rate corresponding to the first rate when the switch is in the first position, for receiving the signal oscillating at the second rate for sequentially illuminating the diodes at a rate corresponding to the second rate when the switch is in the second position and for receiving the time delay signal for ultimately illuminating only one of the diodes when the switch is in the second position.

4,017,082

MEANS AND METHOD FOR PLACING A GOLF BALL POSITION MARKER ON A PUTTING GREEN AND FOR REMOVAL THEREOF

Charles E. Channing, Dover, and George H. Darrell, Dedham, both of Mass., assignors to Charles E. Channing, Dover, Mass.

Filed Apr. 29, 1975, Ser. No. 572,879
Int. Cl.² A63B 57/00
U.S. Cl. 273—162 D **19 Claims**



3. A method of placing a golf ball position marker in position on a putting green without bending by the user, which method comprises:

a. providing a golf club putter having a golf club putter head at the one end with a bottom surface, the golf club putter head containing a permanent magnet, the outer surface of the magnet being substantially flushed with the bottom surface of the golf club putter head;

b. providing a golf position marker which comprises a material which will adhere to the permanent magnet in the golf club putter head, the marker having a ground engaging projection extending from one surface thereof;

c. manually placing without bending the golf ball position marker into contact with the permanent magnet in the golf club putter head to retain the marker in position solely by magnetic attraction between the marker and the magnet;

d. manually lowering the golf club putter head with the marker to the surface of a putting green and to and above a position on the putting green which is to be marked;

e. pressing the ground engaging projection of the marker into the desired position on the putting green by manually exerting sufficient pressure downwardly on the other end of the golf club putter; and

f. sliding the golf club putter head in a lateral direction generally parallel to the surface of the putting green until said magnet has slid sufficiently out of contact with the

golf ball position marker, so that the golf club putter head may be removed and the marker left in the desired position on the putting green.

10. In combination a golf club putter and a golf ball position marker, which combination comprises:

a. a golf club putter comprising

i. an elongated rod having a one end and another end,

ii. a handle at the one end adapted to be gripped by the user,

iii. a golf club putter head at the other end, the putter head characterized by a bottom surface substantially transverse to the other end,

iv. a permanent magnet having a magnetic pole disposed transversely to the other end of the rod, and

v. the magnet secured within the golf club putter head, the outer surface of said magnet being substantially flushed with the bottom surface of the golf club putter; and

b. a golf ball position marker comprising

i. a material which will adhere magnetically to the permanent magnet in the golf club putter head, and

ii. the marker having ground engaging projection means extending from one side of the marker to retain the marker in position on a putting green, whereby the magnet in the golf club putter head is employed in use to place the golf ball position marker onto the putting green and to mark a golf ball position, and to remove the golf ball position marker from the green without the need for the user to bend and stoop for such placement and removal.

4,017,083

PUTTER

James A. Johnson, 59 Ocean House Road, Cape Elizabeth, Maine 04107

Filed Sept. 19, 1975, Ser. No. 615,095

Int. Cl.² A63B *69/36;* **A63H** *1/32*

U.S. Cl. 273—164 **9 Claims**

1. A putter comprising a shaft and a head including a ball engaging portion having a chamber, a fly wheel within said chamber adjacent the outer end of said head with its axis disposed lengthwise thereof, the length of said shaft and the angle between said shaft and said axis being such as to enable the ball to be engaged by the ball engaging portion of the head when the shaft is held by the user while standing in putting position, and a battery powered drive for said fly wheel within said putter and connected to said fly wheel, said drive operable to effect the rotation of said fly wheel at a rate such that a gyroscopic force is exerted on the outer end of the head adequate to stabilize the head against accidental turning during a putt from a position at right angles to the wanted path for the ball, said drive including a battery source, a low voltage, high speed motor, and a circuit between said motor and said source and including a switch.

4,017,084

GOLF PUTTING AND CHIPPING DEVICE

Ernest Jeffery, 1 Liszt Gate No. 810, Willowdale, Ontario, Canada (M2H 1T6)

Filed June 30, 1975, Ser. No. 591,516

Int. Cl.² A63B *69/36, 67/02*

U.S. Cl. 273—176 FB **4 Claims**

1. In a golf practice and amusement device enabling a player to practice both chipping and putting the combination of a receptacle including side, front and upper walls defining an inner compartment, said upper wall being dished to present a central recessed cup-like portion occupying the major area thereof, a roll of carpet mounted rotatably within said inner compartment, a transversely extending aperture formed in the lower portion of said front wall dimensioned to permit the withdrawal of said carpet therethrough, said carpet having an upper surface, when withdrawn from said receptacle, comprising a first area adjacent the free end thereof formed of a material offering a predetermined resistance to the movement of a golf ball thereacross and substantially the entire remaining upper surface formed of a material offering a lesser resistance to the movement of a golf ball thereacross.

4,017,085

GOLF GAME

Charles Stephen Maxwell, 2995 Altamont Crescent, West Vancouver, British Columbia, Canada (V7V 3C2)

Filed Feb. 27, 1976, Ser. No. 662,194

Int. Cl.² A63B *67/02*

U.S. Cl. 273—176 FA **15 Claims**

1. A golf game comprising a playing board, an upper surface of the playing board simulating part of a golf course and having a scoring hole therein promixate an end of the playing board and at least one non-scoring hole therein representing a hazard, a golf ball issuing device, switch means associated with each hole to detect capture therein of a golf ball, a scoreboard, logic circuit means including means causing operation of the golf ball issuing device to re-issue a golf ball on detection of a golf ball by one of the switch means and means to assign an initial score to the scoreboard, ball count means counting the balls issued, means assigning a number to the

scoring hole and incrementing the assigned number on detection of a ball in the scoring hole, and score means decrementing said initial score by predetermined values which vary inversely according to a number of issued balls counted for an assigned hole.

4,017,086

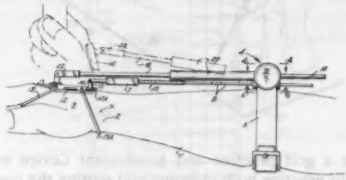
GOLFER'S TRAINING AID

Philip J. Washburn, P.O. Box 936, Roseburg, Oreg. 97470

Filed Nov. 7, 1975, Ser. No. 629,779

Int. Cl.² A63B *69/36*

U.S. Cl. 273—183 B **9 Claims**



1. A device for attachment to a golfer's forearm for the purpose of conditioning arm muscles so as to properly control uncocking of the forearm hand and wrist during the club downswing, said device comprising,

a ratchet assembly including an adjustably biased pawl,

means attaching said assembly to the forearm,

hand retention means in place on the back of said hand for movement therewith,

flexible elongate retention means extending rearwardly from said hand retention means into operative engagement with said pawl of the ratchet assembly,

an abutment member offset rearwardly from the hand retention means and coupled to said ratchet assembly, said abutment member contacted by said hand retention means when the forearm hand is cocked and thereafter during initial uncocking of the forearm hand to maintain the ratchet assembly in place on the forearm against forces exerted by said elongate retention means.

said ratchet assembly pawl permitting rearward displacement of the elongate retention means during cocking of the forearm hand during the backswing and subsequently holding same against extraction, and

said ratchet assembly additionally retaining said elongate and hand retention means in a retracted state until club imparted forces during the downswing overcome the biased pawl of the ratchet assembly resulting in release of the elongate retention means and uncocking of the hand at a desired point in the downswing.

4,017,087

AUTOMATIC GOLF BALL TEEING APPARATUS

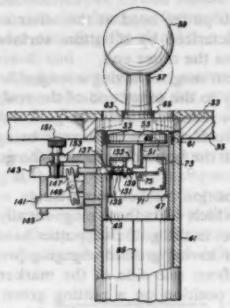
Philip Bruno, 521 W. Hickory St., East Rochester, N.Y. 14445

Filed Nov. 6, 1975, Ser. No. 629,324

Int. Cl.² A63B *57/00*

U.S. Cl. 273—201 **8 Claims**

1. Golf ball positioning apparatus comprising an approximately vertical guideway, a carrier movable upwardly and downwardly along said guideway, a golf ball supporting member mounted on and movable upwardly and downwardly bodily with said carrier, means for moving said carrier between a lower loading position in which a ball may be placed on said supporting member and an intermediate hitting position in which a ball on said supporting means is substantially at a turf reference elevation and a high hitting position in which a ball on said supporting member is at a teed-up elevation higher than said turf reference elevation, an electric switch mounted on and movable bodily with said carrier, said switch having a switch operating member movable between an upper position and a lower position, said switch operating member being biased upwardly toward its upper position and being arranged to be depressed to its lower position by the combined weight of said ball supporting member and a ball carried thereon, the weight of said ball supporting member alone without a ball thereon being insufficient to depress said switch operating member from its upper position to its lower position, driving means controlled by said switch for moving said



carrier along said guideway while said switch operating member is in its upper position and for discontinuing movement thereof along said guideway while said switch operating member is in its lower position, and control means for holding said switch operating member in its upper position to cause operation of said driving means notwithstanding presence of a ball on said supporting member tending to depress said switch operating member to its lower position.

4,017,088

SHAFT SEAL FOR TURBOMACHINES

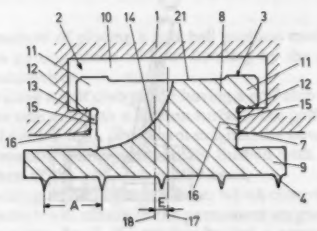
Georg Lerjen, Oberrohrdorf, Switzerland, assignor to BBC Brown Boveri & Company Limited, Baden, Switzerland

Filed Dec. 22, 1975, Ser. No. 643,329

Claims priority, application Switzerland, Mar. 5, 1975, 2755/75

Int. Cl.² F16J *15/44*

U.S. Cl. 277—53 **2 Claims**



1. A shaft and seal structure therefor comprising a casing surrounding the shaft and having a circumferentially extending T-shaped slot opening in the direction of the shaft and which receives a pressurized gaseous medium, at least one row of circumferentially extending assymetrical seal segments located in said T-shaped slot, each said seal segment having a radially outer suspension part located in the radially outer broad part of said T-shaped slot and including end portions which overlie and bear upon correspondingly located shouldered portions of said T-shaped slot to form bearing surfaces therebetween, a radially inner serrated seal part engaging the periphery of said shaft forming a labyrinth type seal therebetween, and a middle part having lateral surfaces — one of which is located on the low-pressure side of the middle part and engages a correspondingly located internal surface at the

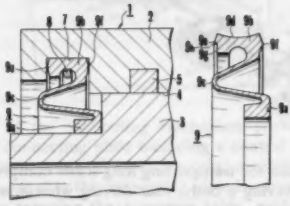
radially inner narrow part of said T-shaped slot to form sealing surfaces therebetween, said pressurized gaseous medium serving to apply a radially inward directed force against the periphery of said seal segments, and the median plane of said radially inner serrated seal part of the seal segments of at least the last row of the low pressure side of the seal being axially offset with respect to the median plane of the middle part thereof in the direction of the high-pressure side of the seal.

4,017,089

SEALING DEVICE FOR HYDRAULICALLY OR PNEUMATICALLY OPERATED EQUIPMENT

Masayuki Kurata, and Yusiyo Watanabe, both of Iwatsuki, Japan, assignors to Akebono Brake Industry Co., Ltd., Tokyo, Japan

Filed July 29, 1975, Ser. No. 600,010
Int. Cl.² F10J *15/24*
U.S. Cl. 277—152 **6 Claims**



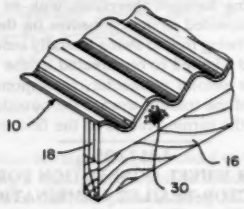
1. A sealing device for hydraulically or pneumatically operated equipment comprising:
a cylinder body;
a piston fitted into said cylinder body;
a circumferential groove provided in said cylinder body, the groove being formed by a pair of confronting walls and a circumferential face forming a bottom for said groove;
a boot which is composed of an internal portion tightly attached to the outer edge of said piston, an external portion having a recess which forms a continuous curvature in the direction of the width of the external portion, and a flexible portion which connects said external portion to said internal portion; and
a resilient ring which presses said external portion of said boot into fitted engagement with said circumferential groove and against said bottom thereof.

4,017,090

CLOSURE STRIP

Irvin Cohen, Reading, Pa., assignor to Construction Fasteners, Inc., Wyomissing, Pa.

Filed July 16, 1973, Ser. No. 379,486
Int. Cl.² E04B *1/68*
U.S. Cl. 277—206 R **12 Claims**



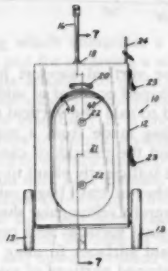
1. An elongated sealing element for interposition between a panel of corrugated configuration and a member extending transversely of said panel, said sealing element having an edge adapted to lie in contact with said panel, of a corrugated configuration corresponding to that of said panel, and said sealing element comprising a laminated structure with the laminations thereof extending longitudinally of the sealing element and with the opposite edges of said laminations adapted to underlie said panel and overlie said member respectively, said laminations having adjoining surface portions secured together and each of said laminations having a porous interior portion coextensive with said surface portions, the porous interior portion of at least one of said laminations having a density greater than the densities of the interior portions of other of said laminations.

4,017,091

GOLF CART

Russell J. Wallen, 1800 Hayes St. NE., Minneapolis, Minn. 55418

Filed June 30, 1975, Ser. No. 591,301
Int. Cl.² B62B *1/04*
U.S. Cl. 280—30 **5 Claims**



1. A convertible golf cart, comprising:
a. a cart body formed of a durable plastic material having a plurality of integrated recesses formed therein being sized to accommodate the handle and shaft of a golf club;
b. a pair of detachable wheels;
c. means for engaging and disengaging said wheels and said cart in an operating position;
d. means carried on an exterior surface of said cart body and on said wheels for engaging and disengaging said wheels and said cart in a storage position;
e. means for supporting said cart in a substantially upright position; and
f. a handle being movable from an operating position to a storage position in which said means for engaging and disengaging said wheels and said cart comprises a plurality of female members of a ball detent connection being positioned on either side of the bottom of said cart in an operating position and a plurality of female members being positioned within a wheel storge recess formed in an exterior surface of said body and including male members of a ball detent connection, engageable with each of said female members, being positioned on each of said wheels.

4,017,092

TRASH BAG CADDY

Virginia M. Boomer, 50575 Fairchild Road, Mount Clemens, Mich. 48043

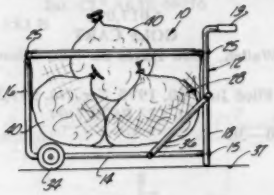
Filed Oct. 20, 1975, Ser. No. 623,981
Int. Cl.² B62B *1/12*
U.S. Cl. 280—47.26 **2 Claims**

1. A trash bag caddy of the type to store and transport loaded plastic trash bags comprising:
a rigid frame having two parallel tubular legs forming a horizontal lower member carrying two vertical supports at opposite ends, one of said vertical supports having handlebar means, the other vertical support terminating in a horizontal support surface; an upper rectangular

member positioned in a vertically spaced relation above said lower member and comprising two releasably joined U-shaped portions which attach to said vertical supports to complete said rigid frame, one joined end of said upper rectangular member being supported by said horizontal surface;

first fastening means extending through said one joined end into said horizontal support surface for simultaneously securing said U-shaped portions to each other and to said horizontal surface;

second fastening means extending through said other joined



end into said one vertical support for simultaneously securing said U-shaped portions at said other joined end to each other and to said one vertical support; and

a multi-apertured bag made from a material sufficiently strong to withstand the attacks of canine creatures and small animals, yet sufficiently pliant to permit the deposit of a variable number of trash bags, said multi-apertured bag being of a generally rectangular shape and having two opposing longitudinal surfaces and two opposing transverse surfaces, said surfaces forming loops, said loops engaging said U-shaped portions of said upper rectangular member.

4,017,093

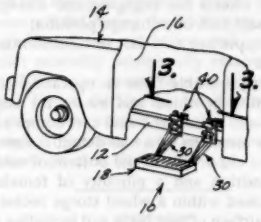
VEHICLE STEP

Alvin Stecker, Sr., Woden, Iowa 50485

Filed Sept. 12, 1975, Ser. No. 612,765

Int. Cl.² B60R *3/02*

U.S. Cl. 280—163 **7 Claims**



1. A vehicle step assembly for being attached to the frame of a vehicle comprising,

a step having width substantially equal to the width of a person's pair of feet,

a pair of spaced apart support arms connected to said step and extending angularly upwardly relative to the top surface of said step and terminating in upstanding portions extending perpendicularly to a plane of said step top surface,

a pair of bracket assemblies for connecting said upstanding portions to the frame of a vehicle, each bracket assembly including a pair of clamping plates for engaging opposite sides of said vehicle frame, and means being provided for connecting one of said clamping plates to said upstanding portion, and

each ofsaid bracket assemblies, and said connecting means including a third clamping plate for engaging said upstanding portion on one side with said one plate of said pair of plates engaging said upstanding portion on the opposite side and said one of said pair of plates also adapted to engage one side of said vehicle frame.

4,017,094

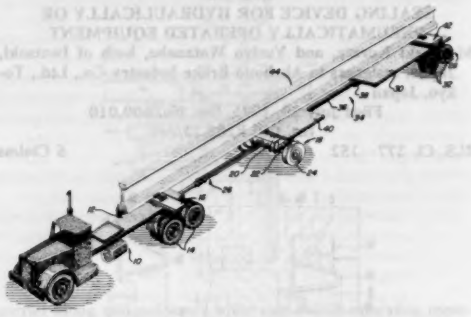
STEERING CONVERTER APPARATUS

Robert Dwayne Pilcher, 1220 S. Utica, Denver, Colo. 80219

Filed Oct. 16, 1975, Ser. No. 622,849

Int. Cl.² B60P *3/40*

U.S. Cl. 280—404 **13 Claims**



1. Apparatus for transporting long loads comprising:

a tractor having a body, rear driving wheels, and forward steerable wheels, a first steering converter trailer truck provided with road wheels, and a second load-bearing trailer truck provided with road wheels;

a forward bolster mounted on the tractor body for rotation about a vertical axis and constructed and arranged to support and be secured to the forward portion of a long load;

the second truck being located well aft of the tractor and provided with an aft bolster mounted thereon for rotation about a vertical axis and constructed and arranged to support and be secured to the aft portion of a long load;

the tractor and the second truck serving to take the entire weight of the load with the latter serving as the draft hitch between the tractor and the second truck;

the first steering converter truck being located at an intermediate position between the tractor and the second truck independently of the load and of the aft bolster, and bearing no part of the weight thereof;

a pivot mount on the first truck;

an elongate follower coupler secured to the second truck in non-load-bearing position independently of the aft bolster and extending forward from the second truck with its forward end connected to the pivot mount for rotation;

a pivotal connector secured to a fixed part of the tractor body independent of the bolster and at a point spaced aft of the pivotal axis of the bolster;

and a steering converter coupler secured to the first truck and extending forward therefrom with its forward end pivotally connected to the connector on the tractor;

the first truck being free to swing laterally independently of the load and adapted to be directed by the lateral movement of the pivotal connector, in response to turning movement of the tractor, toward the outside of the curve to increase the turning radius of the first truck.

4,017,095

FIFTH WHEEL CONNECTION FOR A TRACTOR-TRAILER COMBINATION

William J. Best, Naperville, Ill., assignor to Clark Equipment Company, Buchanan, Mich.

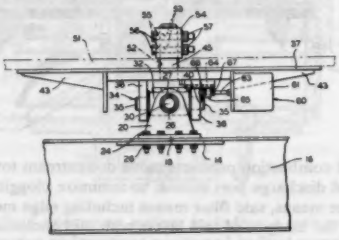
Filed Nov. 19, 1975, Ser. No. 633,187

Int. Cl.² B62D *53/10*

U.S. Cl. 280—438 R **11 Claims**

1. A connecting mechanism provided between a tractor-trailer combination, said connecting mechanism comprising a

first mounting portion including a bracket assembly mountable on a rear bed portion of the tractor, a beam assembly transversely mounted on the bracket assembly for relative pivotal movement therebetween, a mounting table assembly mounted on the beam assembly for pivotal movement transverse to the pivotal movement of the beam assembly, a mounting post extending outwardly from an upper surface of a mounting table associated with the mounting table assembly, a second mounting portion provided on the trailer including a connecting plate suitable for engagement with the first mounting portion of the connecting mechanism provided on the tractor, the connecting plate including a central hole receivable on the mounting post and a retaining mechanism mountable on the post after the connecting plate is mounted thereon and suitably engaging the mounting table, said mechanism comprising a sleeve receivable on the mounting post and means to lock the sleeve to the post, the mechanism retaining the mounting table and the connecting plate is connected cooperative relationship to provide relative pivotal movement therebetween.

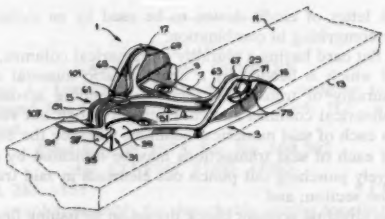


4,017,096

SKI HARNESS

Maurice Pinsonnault, 770, Boulevard Desaulniers, St-Lambert, Quebec, Canada

Filed Aug. 8, 1975, Ser. No. 603,181
Int. Cl.² A63C 9/20
U.S. Cl. 280—615 **27 Claims**



1. A ski harness having a toe plate and a one-piece bail; the toe plate having a base plate; a pair of spaced-apart flanges extending up from the base plate; locking means on the base plate in front of the flanges the one-piece bail having means integral therewith for pivotably, detachably connecting it at one end thereof to the flanges; and projecting lug locking means on the other end of the one-piece bail and integral therewith, directly engageable with the locking means on the toe plate, to detachably lock the one-piece bail to the toe plate.

4,017,097

SKI BINDINGS

Ole Jacob Kvam, Waldemar Thranes gate 84B, Oslo 1, Norway

Filed Feb. 17, 1976, Ser. No. 658,838
Int. Cl.² A63C 9/20
U.S. Cl. 280—615 **9 Claims**

1. A ski binding which comprises a bottom member for mounting on a ski and for receiving a sole of a ski shoe, said member having ears adapted to project upwardly on either side of the toe of said shoe, a guard element having a continuous surface shaped essentially as a shoe toe and pivotably mounted on said ears to permit pivotal movement between upward inactive and downward active positions about an axis passing through said ears, said element having a lateral side and longitudinal sides converging forwardly from opposite ends of said lateral side, said lateral side facing said pivotal axis of said element and defining at its under edge clamp means designed in said upward position to permit insertion on said bottom member of said sole of said shoe at its toe and in said downward position to hold the edge of said shoe sole down against the bottom member with said longitudinal sides of said guard element reaching down adjacent said bottom member, means associated with at least one of said bottom member and said clamp means for retainingly engaging said sole, and said guard element when in said active position being adapted to cover the front edge of the sole of the shoe and a portion of said bottom element which is to lie in front of said front edge, said portion providing the location for an upstanding pin having a locking edge engageable with a retaining portion of said guard element adjacent thereto and said bottom member having a ramp-like shaped rib extending longitudinally of and projecting downwardly from its under side to a position adjacent said pin to space the bottom member from the ski beneath said pin.

4,017,098

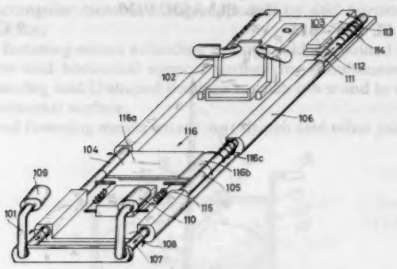
SAFETY BINDINGS FOR SKIS

Bernhard Kirsch, Im Litzelholz 23, 55 Trier-Biewer, Germany

Filed Sept. 5, 1975, Ser. No. 610,743
Claims priority, application Germany, Sept. 7, 1974, 2442902; Mar. 6, 1975, 2509809
Int. Cl.² A63C 9/08
U.S. Cl. 280—625 **7 Claims**

1. A safety binding for skis having a front binding including two arms each carrying a toe-clamp, such toe-clamps being spaced apart and normally engageable with the toe of a ski-boot, the improvement comprising spring means exerting a predetermined force on the arms in a direction substantially longitudinally and rearwardly of the ski for maintaining the toe-clamps in boot toe engaging position, moving means responsive to a forward force exceeding such predetermined rearward force for simultaneously moving such toe-clamps apart transversely of the ski a distance greater than the width of a ski-boot including pivot means having their axes extend-

ing substantially longitudinally of the ski, the arms being swingable about the axis of said pivot means, biasing means

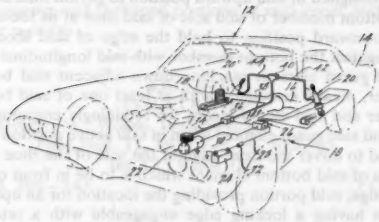


for urging simultaneous swinging of the arms about said pivot means, and means for latching the arms against swinging.

4,017,099
VEHICLE LEVELING SYSTEM

Robert W. Hegel; Burke A. West, both of Monroe, Mich., and Robert H. Verb, Ottawa, Ohio, assignors to Monroe Auto Equipment Company, Monroe, Mich.

Filed June 9, 1975, Ser. No. 585,322
Int. Cl.² B60G *11/28*
U.S. Cl. 280—707 **39 Claims**



11. A vehicle attitude control device comprising first and second telescopic sections in part defining a pressurizable chamber, first and second solid state signal means located within said chamber for controlling the pressure thereof, said solid state means being responsive to longitudinal displacement of said sections for selectively communicating a pressurized media to and from said chamber.

4,017,100
FLUID SUPPLY, FILTER PACK USED THEREIN AND METHOD OF ASSEMBLY

Robert G. Gehrig, Southfield, and George W. Goetz, Detroit, both of Mich., assignors to Eaton Corporation, Cleveland, Ohio

Filed Jan. 8, 1975, Ser. No. 539,220
Int. Cl.² B60R *21/08*
U.S. Cl. 280—736 **14 Claims**

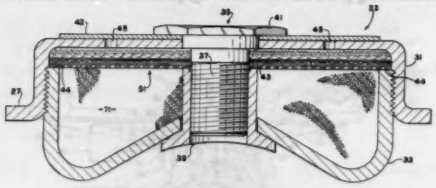
1. A fluid supply for inflating a vehicle occupant restraint system of the type activated in response to a vehicle collision signal; said fluid supply comprising;

a. housing means defining an enclosure having fluid discharge port means;

b. combustible gas generating means disposed within said enclosure said generating means being operable upon ignition to produce gas and combustion products;

c. means operable to activate said gas generating means in response to said collision signal; and

d. filter means disposed in said enclosure between said gas generating means and said fluid discharge port means, said filter means including a plurality of layers of fibrous filter material each of said layers being at least as porous as the next adjacent downstream filter layer, at least the filter layer furthest downstream being fibrous material comprising fibers having diameters less than about twenty microns, said filter means causing filtration of progressively finer of said combustion products as said gas and

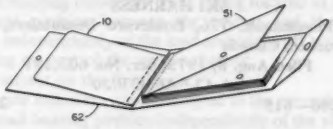


said combustion products move downstream toward said fluid discharge port means, to minimize clogging of said filter means, said filter means including edge means sealing the margins of said layers with said enclosure to prevent by-pass of said gas and combustion products around said filter means to said discharge port means, said filter means further including porous support means intermediate selected ones of said fiber layers.

4,017,101
LETTER OF CREDIT DEVICE

John M. Case, 35 Lehigh Road, Wellesley, Mass. 02181

Filed May 20, 1976, Ser. No. 688,313
Int. Cl.² B42D *15/00*
U.S. Cl. 283—57 **5 Claims**



1. A letter of credit device to be used by an authorized holder comprising in combination:

a. a flat card having a plurality of numerical columns, each of which is headed by a characteristic numeral and a plurality of transaction sections extending across said numerical columns and containing a punch out element in each of said numerical columns, whereby the amount of each of said transactions may be indicated by selectively punching out punch out elements in said transaction section; and

b. an idividual account check drawn on an issuing financial institution;

c. said card and check each having imprinted on it an identification of the issuing institution and the same account number of the holder,

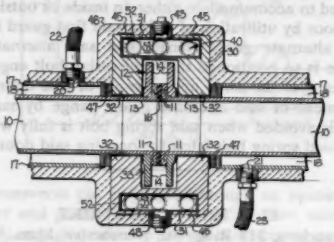
d. said card bearing an identification of the holder, including his signature, and also bearing the terms and instructions upon which credit is to be issued to the holder by a negotiating party; and

e. said check having a punch out element, whereby, when punched out, it serves to identify to the issuing bank that said check was negotiated under said card.

4,017,102
JACKET CONSTRUCTION FOR PIPE COUPLING

James R. Henderson, Charlotte, N.C., assignor to Controls Southeast, Inc., Charlotte, N.C.

Filed June 16, 1975, Ser. No. 587,123
The portion of the term of this patent subsequent to Aug. 26, 1992, has been disclaimed.
Int. Cl.² F16L 53/00
U.S. Cl. 285—41 12 Claims



1. In a fluid conveying system including a pair of pipes having opposing end portions positioned in fluid communication and fastener means cooperating with the opposing end portions of the pipes to releasably secure the pipes together in fluid-tight relation, the opposing end portions of the pipes and the cooperating fastener means collectively defining an enlarged coupling having a predetermined external surface configuration substantially larger than adjoining portions of said pipes, the combination therewith of means cooperating with said enlarged coupling for directing a temperature controlling fluid into heat-transferring relation thereto, said means comprising a plurality of blocks of heat conductive material cooperating with one another to substantially surround and enclose the opposing end portions of said pipes and the fastener means associated therewith, inner surface portions of each block being concave and defining a cavity therein of predetermined shape, the respective cavities of the cooperating blocks collectively defining a hollow chamber substantially conforming to said predetermined external surface configuration of said enlarged coupling so as to receive the coupling in heat-transferring relation therein, and each block also having an enclosed fluid passageway therein extending alongside said cavity and having inlet and outlet ports communicating with the enclosed fluid passageway for circulation of a temperature controlling fluid therethrough, and means associated with said plurality of blocks for securing the blocks in cooperating substantially surrounding relation to said opposing end portions of said pipes and the fastener means associated therewith.

4,017,103
GARDEN HOSE COUPLER

Jonathan L. Lorkowski, Tallmadge, Ohio, assignor to The Raymond Lee Organization, Inc., New York, N.Y., a part interest

Filed July 28, 1975, Ser. No. 599,702
Int. Cl.² F16L 55/00, 41/00
U.S. Cl. 285—155 5 Claims

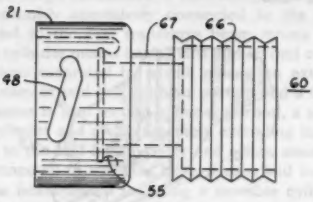
1. A coupler assembly for detachably joining together two lengths of flexible garden hose comprising

a male coupler and a female coupler shaped to matingly detachably engage each other,

each said coupler formed with a through axial hole extending from a first end to a second end and formed on its first end with means to fasten to a length of flexible hose,

said male coupler formed at its second end as a collar open to said second end and fitted with a continuous annular rib of generally rounded cross-section projecting from the inside wall of said collar about the rim of the opening of said collar

said female coupler formed at its second end as a collar open to said second end, with the internal opening of said collar of a size to fit over the collar of the male coupler, and a rim formed inside the collar of the female coupler

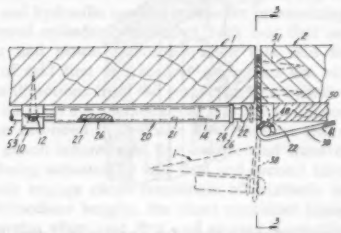


extending from the interior of the said collar and spaced radially inwardly therefrom, said rim being formed with a recessed annular shape of a size to matingly engage the rib of said male coupler collar when said male coupler collar is nested inside the female coupler collar.

4,017,104
DOOR LATCH

Brooks Walker, 1280 Columbus Ave., San Franci co, Calif. 94133

Filed May 24, 1976, Ser. No. 689,092
Int. Cl.² E05C 17/04
U.S. Cl. 292—268 9 Claims



1. In a door structure that includes a frame, and a door having a hinge edge and an opposite latch edge, a safety latch comprising:

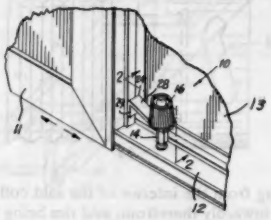
a bar slidably supported on said door for horizontal movement from a retracted position alongside said door and inwardly of said latch edge to a projected position with one end extending past said latch edge,

a plate swingably mounted on said frame for movement between a first position alongside said frame and substantially parallel to the plane of said door to a second position substantially at right angles to the plane of said door,

said plate being formed with an abutment adapted to be engaged by the outer end of said bar when the latter is in said projected position and said plate is in said first position with the door closed to prevent opening movement of said door,

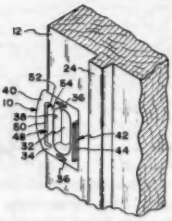
said plate being further provided with an elongated slot closed at its inner end and into which the outer end of said bar may be received when the latter is in said projected position and said plate is in said second position to permit said door to be partially opened with the outer end of said bar against the inner end of said slot and to prevent further opening from said partially open position.

4,017,105
LOCK FOR SLIDING WINDOWS AND DOORS
Lee C. Paxton, 5050 North Ave., Carmichael, Calif. 95608
Filed Dec. 19, 1975, Ser. No. 642,252
Int. Cl.² E05C *19/18*
U.S. Cl. 292—288 **6 Claims**



1. A lock for sliding windows or doors of a type including a frame comprising a shaft, means on said shaft for detachably securing said shaft to the frame, means on said shaft extending upwardly and laterally for engaging the sliding window or door, and hand actuated means on said shaft for twisting said shaft into and out of locked position with respect to said window or door.

4,017,106
STRIKE PLATE FOR SPRING BOLT DOOR LATCHES
Charles Salazar, 2740 E. Indianapolis, Fresno, Calif. 93726
Filed Oct. 7, 1974, Ser. No. 512,457
Int. Cl.² E05C *19/00*
U.S. Cl. 292—340 **8 Claims**



1. An improved strike plate for a spring bolt door latch for latching the lead edge of a door to the door jam of a door opening disposed between an inside area and an outside area, comprising:

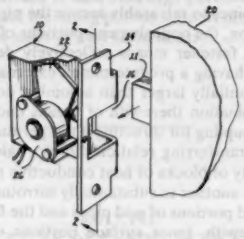
a planar base plate with a back surface and a face surface, said base plate having a leading edge deflected out of alignment with said base plate plane in the direction of said back surface to provide a latch cam surface, and a trailing edge disposed on the opposite edge of said base plate from said leading edge, and said base plate having a latch bolt opening therein disposed between said leading edge and said trailing edge;

mounting means on said base plate for securing said base plate to said door jam with its back surface against said jam and said latch bolt opening aligned with a bolt recess in said jam;

a first guard flange interconnected with said base plate and positioned to project from said base plate outwardly from and substantially normal to said face surface thereof and disposed adjacent said latch bolt opening on the side thereof closest to the trailing edge of said base plate to prevent access to said spring bolt through the swing space between said door jam and the lead edge of said door when said base plate is mounted to said door jam by mounting means; and

an alternate guard flange interconnected with said base plate and disposed on the opposite side of said latch bolt opening from said first mentioned guard flange and between said base plate leading edge and said latch bolt opening, and positioned to be bent to project from said base plate outwardly from said face surface sufficient to prevent access to said spring bolt through said swing space between said door jam and the lead edge of said door when said base plate is mounted to said door by said mounting means, whereby said strike plate can be arranged to accommodate either an inside or outside opening door by utilization of either said first guard flange or said alternate guard flange, and said alternate guard flange is so positioned that said spring bolt engages and passes over the same upon closing of said door and engagement of said alternate guard flange by said spring bolt is avoided when said spring bolt is fully withdrawn into said spring bolt latch for opening said door.

4,017,107
ELECTRIC DOOR STRIKE
Leland Hanchett, 211 Ridge St., Winchester, Mass. 01890
Filed Nov. 11, 1974, Ser. No. 522,340
Int. Cl.² E05C *3/02*
U.S. Cl. 292—341.16 **3 Claims**



1. Electric strike apparatus comprising a strike frame having a front face plate and a jam face plate; means defining a notch in said strike frame for receiving a latch or dead bolt; a rotary solenoid positioned adjacent said strike frame and having a shaft extending therefrom, said shaft rotatable between a first and second position; a shutter positioned adjacent said front face plate and tied to said shaft for joint movement with said shaft between said first position exposing said notch and said second position covering a portion of said notch to prevent passage of said latch or dead bolt through said portion of said notch; spring biasing means urging said shutter to said second position; and said electric strike apparatus further including a spring latch positioned adjacent said notch and extending into the path of said latch or dead bolt as said latch or dead bolt is extended into said notch, said spring latch extending into the path of said shutter as said shutter moves from said first position to said second position, said spring latch being urged out of the path of said shutter by contact with said latch or dead bolt.

4,017,108
WINDOW STAY
Richard David Hamblin, Birmingham, England, assignor to Archibald Kenrick and Sons Limited, England
Filed Apr. 17, 1975, Ser. No. 568,912
Int. Cl.² E05C *17/04*
U.S. Cl. 292—262 **7 Claims**

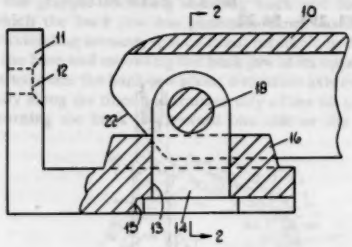
1. A window stay comprising:

a. an attachment part for securement to a window,

b. a circular spigot extending from one side of said part, said spigot having outer side walls and a top wall,

c. said part and spigot having an opening extending therethrough, said opening being concentric with said spigot and forming a recess in said part,

d. a swivel member extending through said opening, said swivel member having a head end disposed within said recess and with the other end portion of said swivel member extending beyond said top wall,



e. a transverse pin extending through an opening in said other end portion of said swivel member, said pin normally engaging said top wall of said spigot,

f. and an elongated stay bar pivotally connected to said pin,

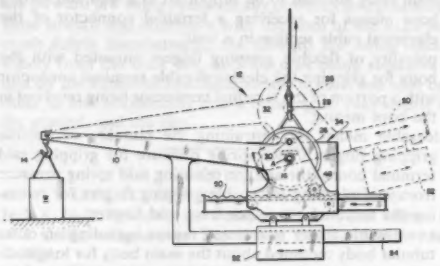
g. the construction being such that said stay bar is pivotable about the axes of said swivel member and said pin.

4,017,109

HOISTING DEVICE FOR A CRANE

Sidney I. Belinsky, 40 Waterside Plaza, New York, N.Y. 10010

Filed Jan. 7, 1976, Ser. No. 647,197
Int. Cl.² B66C *1/16*
U.S. Cl. 294—67 AA **2 Claims**



1. A hoisting device including a pivotal boom, a swing shaft attached to said boom off its axis of pivot, a sun gear mounted on said swing shaft, a planet gear having internal teeth engaging said sun gear, a member adapted to receive a hoisting hook mounted atop said planet gear, a main shaft journalled in said boom, a main gear engaging said sun gear and mounted on said main shaft, a slide secured to the underside of said boom, a counterweight supported on said slide being normally positioned under the journalled end of the main shaft when the boom is unloaded and means actuated by said main shaft for shifting the counterweight from its normal position when said boom is loaded and as the device is hoisted.

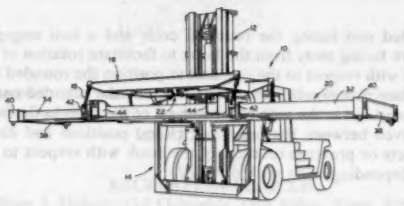
4,017,110

CYLINDER AND PISTON ASSEMBLY

Bobbylee Pease, Battle Creek, and Clark C. Simpson, Martin, both of Mich., assignors to Clark Equipment Company, Buchanan, Mich.

Filed May 19, 1975, Ser. No. 578,445
Int. Cl.² F01B *15/02*; B66C *1/66*; F15B *13/06*
U.S. Cl. 294—81 SF **19 Claims**

1. In a spreader frame for handling cargo containers of a plurality of predetermined lengths by means of lift trucks, van carriers, and the like, having central fixed beam means, first and second oppositely extending telescopic beam means mounted on said central beam means and first and second transverse beam means secured to the outer end portions of said first and second telescopic beam means adapted to engage such cargo containers, a first compound cylinder and piston assembly operatively connected to the fixed beam means and to the first transverse beam means including a movable cylinder means having first and second coaxial cylinder portions separated by a wall means, an extensible first piston means in said first cylinder portion and a fixed second piston means in said second cylinder portion, a second compound cylinder and piston assembly extending in a direction opposite to the said first cylinder and piston assembly operatively connected to the fixed beam means and to the second transverse beam means including a movable cylinder means having first and second coaxial cylinder portions separated by a wall means, an extensible first piston means in said first cylinder portion and a fixed second piston means in said second cylinder portion, spacer means adapted at the time of assembly of said first and second piston and cylinder assem-



blies to be assembled in a selected one cylinder portion of each of said cylinder means for establishing a pre-selected intermediate position of each of said first and second cylinder and piston assemblies for engaging a selected one length container, and hydraulic control means for pressurizing said first and second cylinder portions of both said first and second cylinder and piston assemblies such that said first piston means of said first and second assemblies are extended in opposite directions from the respective first cylinder portions thereof and said cylinder means of said first and second assemblies are extended in opposite directions on the respective second piston means, said first and second transverse beam means being actuated by said first and second assemblies to selectively engage cargo containers of relatively short, long and intermediate lengths, the short container being engageable thereby when said first and second assemblies are retracted, the long container being engageable when said first and second assemblies are extended, and the intermediate container being engageable when said first and second assemblies are extended in intermediate position in which said spacer means is operative to fix said intermediate position.

4,017,111

SAFETY HOOK

Edward S. Sandnes, New Cumberland, Pa., assignor to Presco International, Inc., New Cumberland, Pa.

Filed Apr. 5, 1976, Ser. No. 673,626
Int. Cl.² B66C *1/34*
U.S. Cl. 294—82 R **5 Claims**

1. A safety hook of the type comprising a clevis with a bail, two arms extending from the end of the bail, bores extending through the arms adjacent the bail to receive a pin; a hook having a curved portion with a bill at one end, an eye at the other end thereof and a rounded crest facing one arm of the clevis; a pin extending through said bores and said eye to secure the hook to the clevis between the arms; the clevis extending to the bill to close the hook when the safety hook is in the closed or weight carrying position; and an annular spring on the pin between the hook and the other arm of the

clevis normally positioning the hook adjacent said one arm of the clevis; wherein the improvement comprises a threaded bore extending through said one arm of the clevis radially outwardly of the pin so that the threaded bore sweeps past the crest as the safety hook is moved between the open and closed positions; an insert threadably mounted within said threaded bore and normally extending from said bore towards the hook a distance beyond said crest, the insert having a smooth

rounded end facing the rounded crest and a tool engaging feature facing away from the hook to facilitate rotation of the insert with respect to the one arm to position the rounded end a desired distance from the hook whereby the rounded end of the insert lies in the path of movement of the crest as the hook is moved between the open and closed positions and either restricts or prevents rotation of the hook with respect to the bail depending upon such distance.

4,017,112

DEVICE FOR RELEASING A LOAD FROM ITS SUPPORT

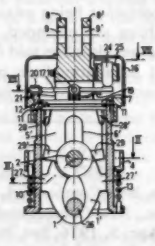
René Delest, Meudon, France, assignor to Callisto, France

Filed Apr. 15, 1976, Ser. No. 677,329

Claims priority, application France, Apr. 21, 1975, 75.12364

Int. Cl.² B66C *1/38*

U.S. Cl. 294—83 R **10 Claims**



1. Device for releasing a load from its support comprising two clamping jaws for the load, mounted inside a sleeve formed with openings and movable in relation to said sleeve under the combined action of the load and of a spring whose action is applied in the opposite direction to the load, between two positions, a lower position where the jaws are compulsorily closed and a higher position where the jaws can open due to the shape of the jaws and the position of the openings with means inhibiting the relative movement of said jaws in relation to said sleeve and driving means arranged so that it stops the action of said inhibiting means.

4,017,113

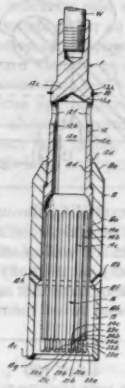
ELECTRICAL CABLE OVERSHOT-GRAPPLING TOOL

Roy H. Cullen; Jimmie R. Aker, and Jim Witovek, Jr., all of Houston, Tex., assignors to General Electric Company

Filed Feb. 4, 1976, Ser. No. 654,992

Int. Cl.² E21B *31/12*

U.S. Cl. 294—86.22 **9 Claims**



1. A fishing tool for retrieveing from a well sections of electrical cable having terminal connectors at the ends of each section, comprising:

a main body adapted to be supported in a well and having bore means for receiving a terminal connector of the electrical cable section in a well;

a plurality of flexible gripping fingers mounted with the body for gripping the electrical cable terminal connector with a portion of the terminal connector being received in the bore means;

releasable means for restraining the plurality of flexible gripping fingers under spring pressure for gripping said terminal connector and for releasing said spring pressure from said plurality of flexible gripping fingers for releasing the terminal connector from said fingers;

the releasable finger restraining means including an outer tubular body mounted about the main body for longitudinal movement relative thereto between a position about the flexible gripping fingers for retaining said flexible gripping fingers under spring pressure inwardly relative to each other for gripping the electrical cable terminal connector and a position above said flexible gripping fingers for releasing said fingers for movement outwardly relative to each other for releasing the terminal connector; and

the outer tubular body including an enlarged counterbore portion forming a space between the outer tubular body and a portion of the plurality of gripping fingers with the outer tubular body positioned about the gripping fingers for limited outward bending of the finger portions to permit the electrical cable terminal connector to pass therebetween upon engagement of the terminal connector with the gripping finger ends with the terminal connector being received between said gripping fingers.

4,017,114

MULTIDIRECTIONAL GRAPPLE

Roy E. LaBounty, 1607 - 8th Ave., Two Harbors, Minn. 55616

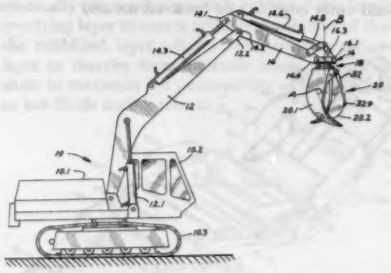
Filed Nov. 13, 1975, Ser. No. 631,509

Int. Cl.² B66C *1/42*

U.S. Cl. 294—88 **7 Claims**

1. A multidirectional grapple for a backhoe having a swing-house, a vertically swingable boom extending outwardly from

the swinghouse, and a forwardly extending, hydraulically powered elongate stick mounted to the boom, a tiltable base swingably mounted on the stick for tilting about a horizontal tilt axis extending transversely of the stick, the base having a hydraulic cylinder connected to the stick to control tilting of the base, the grapple including coacting back and forward jaws of which the back jaw has generally downwardly and outwardly extending arcuate, spaced tines; rotatable hydraulic means on the base and mounting the back jaw at its upper end to the base to rotate the back jaw about a rotation axis extending generally along the tines and transversely of the tilt axis, to facilitate turning the back jaw toward one side or the other



from a normal position in which the tines of the back jaw extend downwardly and forwardly in position to forwardly rake the ground, the back jaw being movable relative to the base only about said rotation axis; the forward jaw being pivotally mounted at its upper end to the back jaw and having arcuate tines curved oppositely to the tines of the back jaw, the forward jaw being hydraulically powered and positioned to close toward and interleave with the tines of the back jaw to crush debris therebetween; the forward jaw being openable widely from the back jaw, and the jaws being rotatable as a unit by the rotatable hydraulic means toward one side or the other to bite horizontally into a building, to rake debris from the ground, and the like.

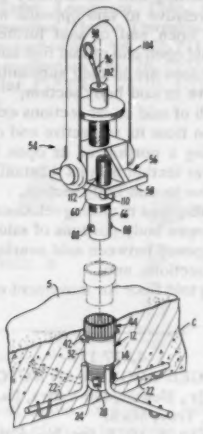
4,017,115

LIFT SYSTEM FOR CONCRETE SLABS

Jack A. Holt, Belmont, and Philip A. Torbet, San Mateo, both of Calif., assignors to The Burke Company, San Mateo, Calif.

Filed Dec. 17, 1975, Ser. No. 641,529
Int. Cl.² B66C *1/66*
U.S. Cl. 294—89 **18 Claims**

1. A remotely releasable hoisting coupling for selective engagement with a concrete slab having a surface, a cylindric passage formed in the slab in generally perpendicular relationship to the surface and opening therethrough, and an annular abutment within the passage below the surface, said coupling comprising: a cylindric body sized for entry into said passage; at least one lug engagable with said abutment and supported in said body for movement relative thereto between a position protruding laterally from said body at which the lug engages the abutment and a position retracted into said body at which the lug is disengaged from the abutment, said body defining a central bore; an actuator rod axially movable in said bore and having an inner end operatively connected to said lug and an outer end accessible from the surface of the slab; means operatively connecting said lug to said actuator rod so that in response to axial movement of the actuator rod in one direction relative said body said lug is moved to the retracted position and, in response to axial movement of the actuator rod in an opposite direction relative to said body, said lug is moved to the protruding position; means within said body for resiliently biasing said actuator rod in said opposite direction so as to correspondingly bias said lug to the protruding position; means secured to the externally accessible end of said actuator rod for selectively moving the rod axially in said one direction to move the lug to the retracted position; and, means



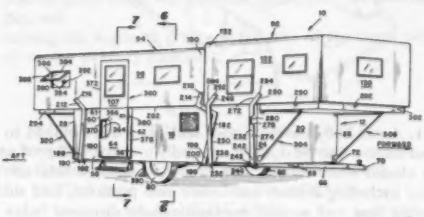
secured to said body exterior of the slab for affording attachment of a hoisting line thereto.

4,017,116

RECREATION VEHICLE

William J. Hulsey, 114 Columbia, Oak Ridge, Tenn. 37830

Filed Aug. 11, 1975, Ser. No. 603,514
Int. Cl.² B62D *33/08*
U.S. Cl. 296—26 **9 Claims**



1. A recreational vehicle convertible in size comprising:

a body portion including a floor, end walls and side walls joined to and extending upwardly from said floor and joined together along their adjacent upright side edges to define a rigid open-top box-type structure, said body portion having a relatively low profile,

a first cover section including roof means, and end wall and side walls joined to and depending from said roof means and joined together along their adjacent upright side edges to define a rigid open-bottom box-type structure having one open end, said first cover section being of a geometry and size that permits nesting of one end of said body portion therein,

means mounting said first cover section for substantially arcuate movement of said first cover section between substantialy nesting and substantially non-nesting positions thereof relative to one end of said body section,

a further cover section including roof means, and end wall and side walls joined to and depending from said roof means and joined together along their adjacent upright side edges to define a rigid open-bottom box-type structure having one open end, said further cover section being of a geometry and size that permits nesting of said body section and the open end of said first cover section therein,

means mounted said further cover section for substantially arcuate movement of said further cover section between substantially nesting and substantially non-nesting positions thereof relative to said opposite end of said body sections, said open end of said further cover section overlapping said open end of said first cover section when said cover sections are in their substantially non-nesting position relative to said body section,

a portion of each of said cover sections extending in cantilevered fashion from its respective end of said body section and having a portion of its open bottom exposed when said cover section is in its substantially non-nesting position relative to said body section,

means movably disposed in closing relationship with each of said exposed open body portions of said cover sections,

seal means interposed between said overlapping open ends of said cover sections, and

means mounting said floor for movement over a supporting surface.

4,017,117

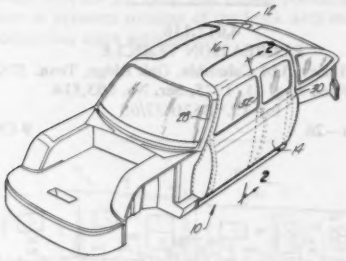
ROOF HINGED DOOR IN AN AUTOMOBILE

Walter S. Eggert, Jr., Huntingdon Valley, Pa., assignor to The Budd Company, Troy, Mich.

Filed Oct. 8, 1975, Ser. No. 620,902

Int. Cl.² B60J *5/00*

U.S. Cl. 296—146 **4 Claims**



1. A car body having a roof section, a door hinged to said roof disposed to be opened upwardly towards said roof and to be closed when moved downwardly against a side sill, said door including bottom and inside side portions, said side sill having first and second perpendicularly disposed ledge sections to receive the bottom and inside side portion of said door therebetween when said door is closed, said first ledge section of said side sill being offset outwardly from the vertical plane of the body of said car body, said second ledge portion of said side sill being offset downwardly below the horizontal plane of said car body whereby an inward impact of said door causes the bottom and inside portion of said door to crush and lock into said first ledge section preventing said door from riding over said side sill upon impact.

4,017,118

PATIENT SUPPORTING DEVICE

Reginald E. Cawley, 12826 Chapman Ave., Apt. B, Garden Grove, Calif. 92640

Filed Apr. 19, 1976, Ser. No. 678,296

Int. Cl.² A47C *3/00*

U.S. Cl. 297—284 **26 Claims**

22. A device for supporting a patient comprising

seat means,

backrest means extending from one end of said seat means and having an outer edge remote from said seat means,

toeboard means extending from the opposite end of said seat means,

a headrest on said backrest means beyond said outer edge thereof, said headrest including

a support,

a central pad,

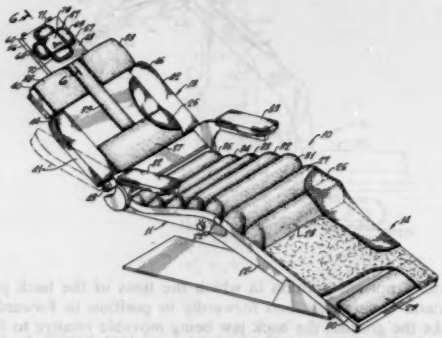
four additional pads,

and means connecting said four additional pads to said support adjacent and around the periphery of said central pad so as to provide a top, a bottom, and two side pads for said headrest with the corners of said additional pads in adjacency,

and inflatable means for varying the surface contour of said device, said inflatable means including

a first transverse bladder on said backrest means adjacent said seat means,

a second transverse bladder on said backrest means spaced from said first transverse bladder and adjacent said outer edge of said backrest means,



a central bladder on said backrest means extending from adjacent said outer edge thereof to adjacent said first bladder,

a bladder beneath each of said additional pads of said headrest for moving each of said additional pads outwardly upon inflation thereof,

at least one transverse bladder on said toeboard means adjacent said seat means for providing the effect of a continuation of said seat means upon inflation thereof,

a plurality of transverse bladders on said seat means extending inwardly from said end adjacent said toeboard means, and means for selectively inflating said bladders.

4,017,119

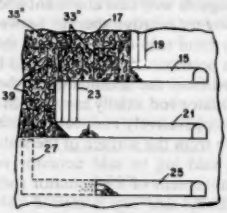
METHOD FOR RUBBLIZING AN OIL SHALE DEPOSIT FOR IN SITU RETORTING

Arthur E. Lewis, Los Altos, Calif., assignor to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed Mar. 25, 1976, Ser. No. 670,478

Int. Cl.² E21B *43/26;* **E21C** *41/10*

U.S. Cl. 299—2 **10 Claims**



1. A method for preparing a block of an oil shale deposit for in situ retorting, the block being comprised of alternate layers of rich and lean shale, including the steps of:

developing a vertical access tunnel in the deposit;

driving a horizontal tunnel from the the access tunnel into the deposit;

performing sublevel caving of both rich and lean oil shale layers overlying the distal end of the tunnel to rubblize at least the two immediately overlying layers;

removing a sufficient amount of accessible rubblized shale in the tunnel to permit the rubblized layer adjacent the immediately overlying rubblized layer to drop to the floor level of the tunnel to thereby form a column of shale of different compressability than the horizontally adjacent shale;

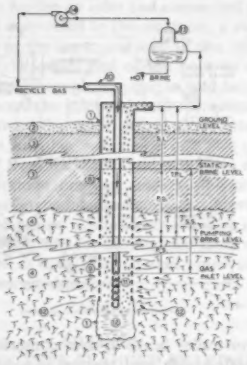
performing additional sublevel caving towards the proximate end of the tunnel; and

periodically removing accessible rubble of the immediately overlying layer to create additional columns of shale from the rubblized layer adjacent the immediately overlying layer to thereby form alternate zones of rich and lean shale to maximize the permeability of the oil shale block to hot fluids during retorting.

4,017,120
PRODUCTION OF HOT BRINES FROM LIQUID-DOMINATED GEOTHERMAL WELLS BY GAS-LIFTING

Elwood L. Carlson, Clayton; Albert A. Gunkler, Walnut Creek; Conrad O. M. Miller, Concord, and H. Hunter Paalman, Walnut Creek, all of Calif., assignors to The Dow Chemical Company, Midland, Mich.

Filed Nov. 28, 1975, Ser. No. 636,192
Int. Cl.² E21B *43/00, 43/28*
U.S. Cl. 299—5 **5 Claims**



1. The method of producing from a subterranean formation a hot brine containing a dissolved gas and from which mineral precipitation will tend to occur if the composition of said gas in the brine is substantially altered, comprising

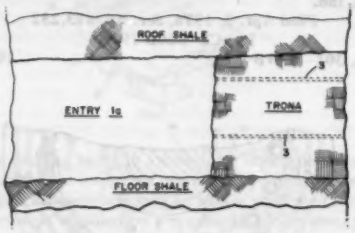
gas-lifting said brine to the surface of the earth, through a well bore communicating with said formation, using a gas of essentially the same composition as said dissolved gas, including steam, and

discharging the resulting gas/brine mixture from said well against a back pressure which is maintained at a level not substantially lower than the vapor pressure exerted by the brine at the temperature prevailing at the point of introduction of the lift gas in said well, thereby preventing substantial subsurface flashing or stripping of the brine.

4,017,121
LONGWALL MINING OF TRONA WITH PREFRACTURING TO PREVENT SLABBING

Robert Harold Trent, Longmont, Colo., assignor to Allied Chemical Corporation, Morris Township, N.J.

Continuation-in-part of Ser. No. 526,771, Nov. 25, 1974, abandoned. This application Apr. 28, 1975, Ser. No. 572,250
Int. Cl.² E21C *27/10, 37/12*
U.S. Cl. 299—11 **8 Claims**



1. In the longwall method of mining a sub-surface, substantially horizontal bed of trona by driving substantially parallel entries into the trona bed, connecting the entries by at least one primary passage to define a main trona pillar to be mined, and mining the exposed face of the trona pillar along the primary passage, the improvement which comprises prefracturing the trona in situ to substantially reduce slabbing of the trona at the longwall face by

a. driving one or more holes into the trona pillar to be mined;

b. introducing fracturing agent into the hole or holes, and

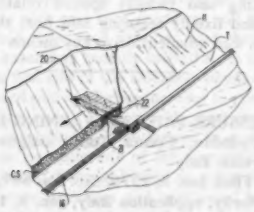
c. causing the fracturing agent to fracture the trona in situ without substantial displacement of the trona so that the prefractured trona will continue to support the overburden and

d. mining the exposed, prefractured face of the trona pillar along the primary passage.

4,017,122
LONGWALL TRENCH MINING SYSTEM

Peter Joseph Simpson, Niagara Falls, Canada, assignor to Acres Consulting Services Limited, Toronto, Canada

Filed June 23, 1976, Ser. No. 698,878
Int. Cl.² E21C *41/00*
U.S. Cl. 299—11 **21 Claims**



1. A method of mining minerals from a bed located below ground comprising:

forming an elongated trench of predetermined width to the depth of the mineral bed,

mining the minerals from the mineral bed within the lateral confines of the trench,

providing a mining tunnel through the mineral bed to one side of and substantially perpendicular to the trench for a distance at least several times the width of the trench at its base to form a long wall surface,

providing longwall mining equipment in the mining tunnel,

mining minerals from the longwall surface by utilizing the longwall mining equipment,

advancing the longwall mining equipment in a direction generally parallel to the trench to mine the minerals of the mineral bed, and

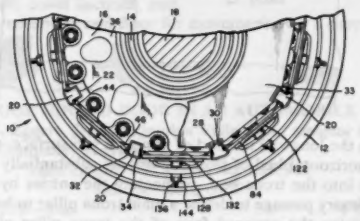
removing the mined minerals.

4,017,123

DUAL LAYER HEAT SHIELD FOR WHEELS

Richard F. Horner, and Jaring Vander Veen, both of South Bend, Ind., assignors to The Bendix Corporation, South Bend, Ind.

Filed Apr. 2, 1976, Ser. No. 673,232
Int. Cl.² B60B *19/00*
U.S. Cl. 301—6 WB **10 Claims**



1. A wheel and heat shield therefor comprising in combination:

a tire supporting wheel rim defining a brake cavity adapted to receive a brake assembly having rotatable and non-rotatable frictionally engageable members;

a plurality of elongated drive key means fixedly secured to said wheel rim in circumferentially spaced apart formation and extending radially inwardly therefrom into engagement with said rotatable member;

a plurality of heat shields removably secured in position between said plurality of drive key means to define a substantially continuous annular wall having a radially spaced relationship to said wheel rim;

each of said heat shields including first and second spaced apart plate members fixedly secured together to define a rigid double wall structure having an air space therebetween and opposite side portions engaged with adjacent drive key means for supporting the heat shield in spaced apart relationship with said wheel rim; and

fastening means including a spacing member operatively connected to said heat shield and said wheel rim for reinforcing said radially spaced relationship therebetween and fixedly securing said heat shield in position between said adjacent drive key means.

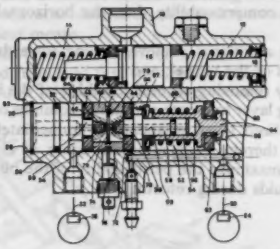
4,017,124

PRESSURE FAILURE WARNING DEVICE

Leonardo Cadeddu, Crema, Italy, assignor to Benditalia S.p.A., Crema, Italy

Filed Jan. 7, 1976, Ser. No. 647,303
Claims priority, application Italy, Jan. 9, 1975, 19115/75
Int. Cl.² B60T *8/26*
U.S. Cl. 303—6 C **9 Claims**

3. A failure detector for detecting pressure failure in a system having two independent hydraulic circuits comprising a housing with a bore slidably receiving a movable piston-forming assembly so as to define in the bore on opposite sides of the said movable piston-forming assembly two pressure chambers connectible to the two independent hydraulic circuits, switch means being provided to make electrical contact when the movable piston-forming assembly moves in either direction from a central idle position due to a pressure difference denoting failure of one of the two independent circuits, said movable piston-forming assembly comprising a sleeve cooperating with the switch means and two resilient elastomeric discs, said movable piston-forming assembly being mounted on supporting means remotely fixed to the housing, said supporting means including a cylindrical rigid core coaxial with the bore and two axial projections extending from opposite sides of the core and being smaller in diameter than the core, said sleeve being slidable along both the bore and the core whereas said discs are axially secured in fluid-tight manner on said axial projections and are sealingly slidable on said bore at their periphery, said sleeve having the same axial length as the core, one face of each resilient disc being partly in contact with one side of the core when the movable assembly is in said central idle position such that the core is entirely contained within the sleeve.

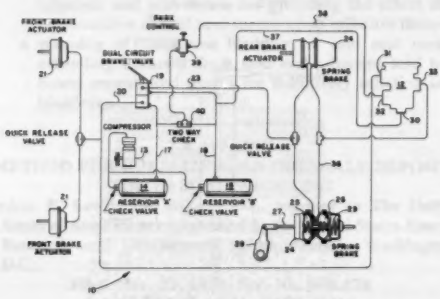


4,017,125

INVERSION BRAKE VALVE AND SYSTEM THEREFOR

Harold Durling, Elsie, Mich., assignor to Midland-Ross Corporation, Cleveland, Ohio

Filed Sept. 9, 1975, Ser. No. 611,648
Int. Cl.² B60T *13/44*
U.S. Cl. 303—7 **7 Claims**



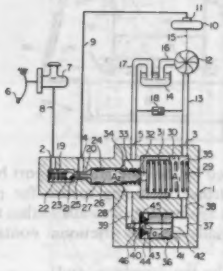
5. A tractor-trailer brake system comprising a first brake circuit associated with said tractor, a second brake circuit associated with said trailer, a plurality of brake actuators in each circuit, means for generating in each circuit fluid at supply and service pressures, tractor protection valve means on said tractor providing fluid communication between said tractor and said trailer when fluid at supply pressure is ported thereto and interrupting fluid communication between said tractor and said trailer in an off position when fluid at supply pressure drops below a predetermined pressure, trailer valve means on said trailer operable to actuate said trailer brake actuators when said tractor protection valve means is in an off position, first valve means on said tractor biased by a source of fluid at signal pressure to provide fluid communication between the higher source at supply pressure in each circuit with said tractor protection valve means and effective to modulate said higher source of supply pressure in accordance with the pressure developed by said signal source of fluid; and inver-

sion valve means providing said source of signal fluid and normally operable to generate said signal source of fluid at supply pressure and operable in a brake failure mode to decrease the pressure of said signal source of fluid at a rate proportional to said source of fluid at service pressure when a decrease in said source of fluid at supply pressure in said second circuit occurs.

4,017,126
VEHICLE ANTI-SKID BRAKING DEVICE

Yoshimoto Ohta, Kawasaki, Japan, assignor to Tokico Ltd., Japan

Filed Oct. 28, 1975, Ser. No. 626,445
Int. Cl.² B60T 8/00
U.S. Cl. 303—115 **5 Claims**



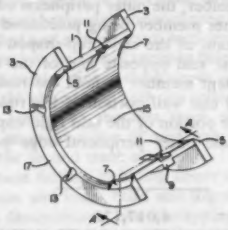
1. A vehicle antiskid braking device for use in a hydraulic braking system for applying hydraulic pressure to a brake cylinder of a wheel of a vehicle and having a main valve means for controlling flow of hydraulic fluid to the brake cylinder, said device comprising a hydraulic pump driven by the rotational force of the wheel, a reservoir connected to said pump for supplying hydraulic fluid to the pump, a valve means comprising a bore having an inlet end connected to the pump and an outlet end connected to the reservoir, a valve member slidably disposed in the bore, one end of the valve member cooperating with the outlet end of the bore to cut off fluid communication therethrough, a spring in said bore urging the valve member toward the inlet end, said valve member having a leak passage formed therein to afford a restricted fluid flow through the valve member when said one end of the valve member is spaced from the outlet end, the valve means opening at a predetermined pressure and closing at a pressure lower than said predetermined pressure, and pressure responsive means coupled to said inlet end of said valve member and acting on said valve means for closing said main valve means when the pressure at said inlet to said valve means drops below a predetermined value.

4,017,127
SLEEVE TYPE FLANGED BEARING

John R. Smith, St. Clair Shores, and Ronald J. Thompson, Brighton, both of Mich., assignors to Federal-Mogul Corporation, Detroit, Mich.

Filed June 2, 1975, Ser. No. 583,008
Int. Cl.² F16C 33/14
U.S. Cl. 308—23 **11 Claims**

1. A flanged engine bearing assembly comprising at least one first bearing member comprising a substantially semicylindrical engine bearing shell, at least one second bearing member comprising a loosely fitted, co-terminus substantially semicylindrical flange located on at least one axial end of said shell and extending radially outward therefrom, said shell and said flange including interengaging support means for supporting said flange on said shell in a manner permitting unlimited axial displacement of said bearing members relative to one another and preventing unlimited relative circumferential rotation, said locking means including a plurality of relatively spaced notches along the co-terminus portion of one of said bearing members and a plurality of projecting lugs along the correspondingly co-terminus portion of said other bearing member,

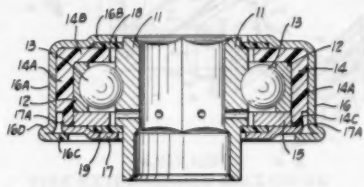


and each said lug being in loosely and separable interfitting engagement with a respective one of each of said notches such that the bearing members may be axially separated from one another even as installed on a crankshaft within an engine.

4,017,128
BALL BEARING ASSEMBLY

William O. Setele, Independence, Ohio, and Donald A. Miller, Sterling, Ill., assignors to Kendale Industries, Inc., Valley View, Ohio

Filed Feb. 17, 1976, Ser. No. 658,520
Int. Cl.² F16C 19/04
U.S. Cl. 308—174 **15 Claims**



1. A ball bearing assembly comprising an inner race member and outer race member, said race members defining opposed annular bearing surfaces for accommodating a plurality of ball bearings located therebetween, a plurality of ball bearings arranged in a circle between said opposed annular bearing surfaces, a rigid cup-shaped shell having an annular outer portion concentric with said race members and spaced radially outward of said outer race member, said shell having an end wall portion extending radially inward from said annular outer portion at a first end of the assembly beyond said outer race member toward said inner race member to guard said ball bearings at said first end of the assembly, said shell having a shoulder portion extending radially inward from said annular outer portion at an opposite end of the assembly, a resilient member of elastomeric material having an outer portion concentric with said race members and positioned between the outer portion of said rigid cup-shaped shell and said outer race member to resist and resiliently absorb radially directed thrust between said outer race member and said outer portion of the said rigid cup-shaped shell, said resilient member having an end wall portion extending radially inward at said first end of the assembly from said outer portion of the resilient member toward said inner race member and positioned between the end wall portion of the rigid cup-shaped shell and the said outer race member to resist and resiliently absorb axial thrust between said outer race member and said end wall portion of the said rigid cup-shaped shell, a rigid washer having a central opening therein for accommodating said inner race member and disposed concentrically of said assembly, said washer abutting said outer race member at said opposite end of the

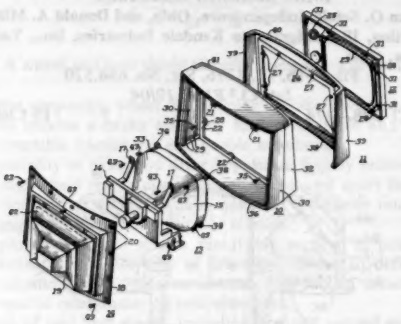
assembly to hold the outer race member firmly between said washer and said end wall portion of the resilient member, and an annular retainer member having a central opening therein for accommodating said inner race member, said retainer member abutting said rigid washer to hold the same against said outer race member, the outer peripheral edge portion of said annular retainer member being positioned intermediate said shoulder portion of the rigid cup-shaped shell and the resilient member at said opposite end of the assembly and abutting said resilient member to hold the resilient member firmly against said end wall portion of the rigid cup-shaped shell, said shoulder portion of the said rigid cup-shaped shell overlapping the said outer peripheral edge portion of the annular retainer.

4,017,129

TELEVISION RECEIVER CABINET WITH FORMED DECORATIVE FRONT

Melvin H. Boldt, Glenview; David P. Chuboff, North Barrington, and Robert W. Becker, Naperville, all of Ill., assignors to Zenith Radio Corporation, Glenview, Ill.

Filed Nov. 14, 1975, Ser. No. 632,350
Int. Cl.² H05K 5/00; A47B 81/06
U.S. Cl. 312—7 TV **7 Claims**



1. A television receiver comprising: a chassis; a picture tube; a cabinet for housing said chassis and picture tube, said cabinet having a top, a bottom, a back, sides and a front frame defining a first substantially rectangular picture tube escutcheon opening; a removable rigid picture tube escutcheon, said cabinet having an unfinished front edge adjacent said rectangular opening, a formed decorative member having a configuration similar to said unfinished front edge of said cabinet and defining a second substantially rectangular picture tube escutcheon opening; means mounting said escutcheon to said front frame of said cabinet in said first opening; means for supporting said picture tube, within said cabinet, from said escutcheon; means supporting said decorative member on said front frame around said second opening; and means fastening the free ends of said formed member to said cabinet to thereby conceal said unfinished front edge.

4,017,130

DISPLAY CASE

Jerry D. Hanson, Spring Lake, Mich., assignor to Structural Concepts Corporation, Spring Lake, Mich.

Filed Nov. 6, 1975, Ser. No. 629,292
Int. Cl.² A47F 3/06
U.S. Cl. 312—128 **9 Claims**

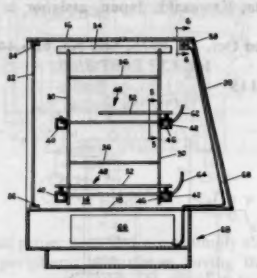
1. A display case for display of bakery goods and the like, said display case comprising:

a cabinet having sidewalls, a top wall, a bottom wall and a front glass wall;

thin elongated support brackets having a plurality of vertically spaced support means thereon;

means removably mounting said support brackets on the sidewalls and spaced above the bottom wall so that the brackets can be quickly and easily removed without the use of tools, said mounting means consisting of receiving means at an upper portion of the sidewalls and means at an upper portion of the support brackets for slidably engaging the receiving means;

at least two crossbars extending between the support brackets on opposite sidewalls, the crossbars having means for removably engaging the support means so that the cross-



bars are supported by the elongated support brackets and the crossbars further including means for pressing the support brackets against the sidewalls so that the brackets are at least partially held by frictional contact with the sidewalls;

shelves supported by the crossbars; and

means releasably fastening the shelves to the crossbars;

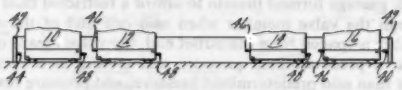
whereby the shelves of the display case can be quickly and easily removed and replaced for complete cleaning of the case interior.

4,017,131

MAXIMUM DENSITY MOBILE STORAGE SYSTEM

Johann L. Camenisch, Dubendorf, Switzerland, assignor to J. Gestle, AG, Chur, Switzerland

Filed Sept. 22, 1970, Ser. No. 74,287
Int. Cl.² A47B 53/00
U.S. Cl. 312—198 **4 Claims**



1. A mobile load carrying system comprising an elongated supporting structure having end stops, a plurality of load carrying devices mounted on said supporting structure in side-by-side relation for movement along a controlled path between said end stops, the length of said path exceeding by a predetermined amount the sum of the widths of the devices whereby to provide at least one loading or unloading gap between selected ones of the devices, a plurality of motive means, each motive means being carried by an individual device, all of said motive means being separate from said supporting structure, sensing means carried by each device on opposite sides thereof for sensing the presence or absence of a gap between either side of said device and an adjacent device or one of said end stops, each sensing means comprising a switch shiftable between a first position when a gap is present and a second position when a gap is absent, means for controlling the motive means of and thereby starting a selected device having both switches in said second position towards a gap and simultaneously energizing the individual motive means of and thereby starting all other devices between said selected device and said gap until the gap is closed, the movement of said devices being in unison, said energizing means including a circuit between a power source and a

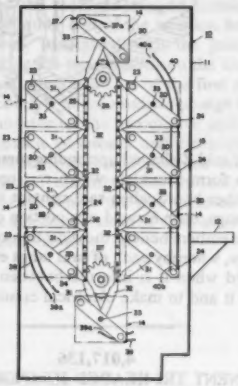
switch on one of said devices which is in said first position, and means responsive to a change in the current in said circuit simultaneously to activate the motive means of said selected device as well as said other devices while the switches of said selected device are both still in their second position.

4,017,132

MECHANIZED FILE CARRIER STABILIZATION SYSTEM

Algis Raymond Banys, Rohnert Park, Calif., assignor to Sperry Rand Corporation, New York, N.Y.

Filed Sept. 19, 1975, Ser. No. 615,008
Int. Cl.² A47B 49/00, 77/16
U.S. Cl. 312—268 **6 Claims**



1. Mechanized filing apparatus of the type in which a plurality of article storage carriers are controllably conveyed along a closed loop path for selectively positioning the carriers at a work station adjacent the apparatus, comprising:

a plurality of carriers each having a lateral shelf member and a pair of side members spaced along and extending transversely of the shelf member for holding and storing articles,

a conveyor assembly for conveying the carriers along the closed loop path, including first and second pairs of vertically spaced wheels laterally separated from one another, a first flexible member extending around and riding on the first pair of wheels, a second flexible member extending around and riding on the second pair of wheels, and means for pivotally suspending each carrier from the flexible members including a pair of suspension arms connected from spaced points along the first flexible member to a rod extending laterally from one side member of the carrier and another pair of suspension arms connected from spaced points along the second flexible member to a rod extending laterally from the other side member of the carrier,

each carrier having a first pair of rollers mounted in diagonally disposed relation to one another on the one side member of said carrier and having a second pair of rollers mounted in diagonally disposed relation to one another on the other side member of said carrier, the diagonal disposition of said second pair of rollers being transverse to the diagonal disposition of said first pair of rollers, and

track means positioned adjacent the carrier side members for guiding the rollers to limit the tilt of the carriers while moving around the closed loop path,

said track means including upper first and second track sections and lower first and second track sections disposed in discontinuous nonoverlapping relation to one another in a vertically oriented plane adjacent the one side member of the carriers, adjacent ends of the upper first and second track sections being spaced along one-half of an upper curved portion of the closed loop path about the upper wheels, adjacent ends of the lower first and second track sections being spaced along one-half of a lower curved portion of the closed loop path about the lower wheels and diagonally opposite the adjacent ends of the upper first and second track sections, said upper and lower first and second track sections being arranged such that as each carrier moves along upper and lower curved portions of the closed loop path one roller of said one side member is guided by the first track sections and the diagonally disposed roller of said one side member is guided by the second track sections,

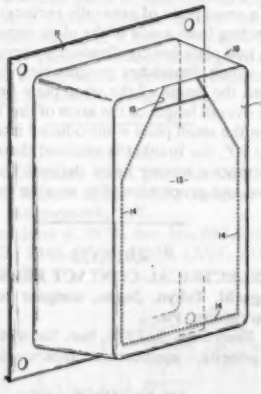
said track means further including upper third and fourth track sections and lower third and fourth track sections disposed in discontinuous nonoverlapping relation to one another in a vertically oriented plane adjacent the other side member of the carriers, adjacent ends of the upper third and fourth track sections being spaced along the other half of the upper curved portion of the closed loop path along which the upper first and second track sections are spaced and adjacent ends of the lower third and fourth track sections being spaced along the other half of the lower curved portion of the closed loop path along which the lower first and second track sections are spaced, said upper and lower third and fourth track sections being arranged such that as each carrier moves along the upper and lower curved portions of the closed loop path one roller of said other side member is guided by the third track sections and the diagonally disposed roller of said other side member is guided by the fourth track sections.

4,017,133

FIRE EXTINGUISHER ENCLOSURE

Eugene B. Sigler, 1920 Burnside, Sioux Falls, S. Dak. 57104

Filed Feb. 23, 1976, Ser. No. 660,341
Int. Cl.² B65D 25/54; A47B 77/18
U.S. Cl. 312—293 **5 Claims**



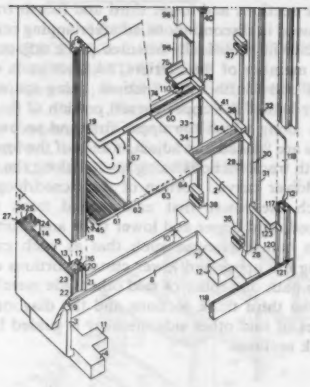
1. An enclosure for a fire extinguisher or the like comprising a box-like structure having one open side, flanges on said structure adjacent said open side whereby said structure may be mounted on a wall, and a front panel readily removable from the front side of said box-like structure opposite the open side.

4,017,134

RACK-MOUNTING FOR ELECTRONIC EQUIPMENTS

Thierry Lenglin, Trebeurden; Albert Lissillour, Tregastel; Jean-Louis Desaunay, Perros-Guirec; Robert Le Corvec, Vanves; Robert Simonneau, Perros-Guirec, and Richard Rouquaud, Grigny, all of France, assignors to L'Etat Francais, represente par le Ministre des Postes et Telecommunications and Socotel Societe Mixte pour le Developpement de la Technique de la Commutation dans le Domaine des Telecommunications, both of Issy-les-Moulineaux, France

Filed July 8, 1975, Ser. No. 593,967
Claims priority, application France, July 8, 1974, 74.24253
Int. Cl.[2] H02B *1/04;* H05K *7/16*
U.S. Cl. 312—351 4 Claims



1. A chassis for electronic equipment comprising a frame structure including two similar spaced uprights connected respectively at their tops and at their bottoms by two similar rigid frames, each frame comprising two lateral plate means fixed respectively to the uprights and connected by crosspiece means, and wherein each upright is constituted by a symmetrical, profiled section defining two spaced, parallel posts connected by a rigid web, each of said posts having vertical grooves defining a T-shape cross section for receiving brackets, a plurality of brackets, each comprising an elongated part adapted to be located in the groove and then rotated through a small angle to a locked position, said elongated part having a cylindrical portion on one side, said elongated part further comprising a small plate of generally rectangular shape, and a nipple projecting from a side of the plate opposite the cylindrical portion, said plate having diagonally opposite corners with a thickness which diminishes progressively towards the edge of the corner, the length of the small plate being substantially equal to the overall length of the arms of the T-shaped groove, so that when the small plate is introduced into the groove and is turned by 90°, the bracket is retained therein, and the bottom of the groove having holes defined therein, each hole being shaped and proportioned to receive said nipple.

4,017,135

ELECTRICAL CONTACT ELEMENT

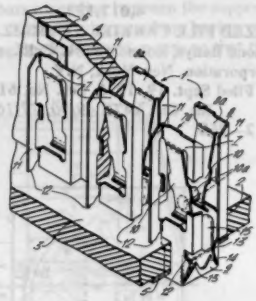
Hiroshi Taguchi, Tokyo, Japan, assignor to AMP Incorporated, Harrisburg, Pa.

Filed Sept. 5, 1975, Ser. No. 610,792
Claims priority, application Japan, Sept. 19, 1974, 49-107095
Int. Cl.[2] H05K *1/08*
U.S. Cl. 339—17 LM 15 Claims

1. A single element contact of electrically conducting material for mounting and making an electrical connection between a mother and a daughter circuit board comprising:

a base having a generally rectangularly shaped cross-section locatable within a hole in the mother board to support the contact upon the mother board and make electrical connection therewith;

a pair of parallel upstanding members having a generally Z-shaped cross-sectional configuration carried upon said base to extend upwardly from the mother board for receiving the daughter board therebetween; and



the ends of said Z-shaped upstanding members being terminated to form shoulders which rest upon the surface of said mother board when said contact is inserted therein;

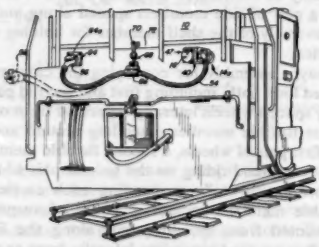
a pair of tangs, each formed of a portion of a respective one of said members bent in the direction of the other of said members, whereby each of said tangs engages the daughter board when it is inserted between said members to support it and to make electrical connection to it.

4,017,136

PERMANENT TRI-HEADED JUMPER CABLE FOR LOCOMOTIVES

Peter J. Sasgen, Forest Park, Ill., assignor to Power Parts Company, Chicago, Ill.

Filed Aug. 25, 1975, Ser. No. 607,559
Int. Cl.[2] H01R *33/00*
U.S. Cl. 339—28 3 Claims



1. An improved jumper system for use in the electrical interconnection of a pair of locomotive units of a consist for hauling trains, where the end of each locomotive unit adjacent the other locomotive unit is originally provided adjacent one side thereof with a receptacle substantially enclosing a multiple-pronged terminal connector;

said improved jumper system comprising, in combination:

an elongated hollow junction box having opposite ends and side walls means, transverse to the ends, that enclose and surround a space between said opposite ends of the box, and an aperture in said side wall means,

a first mounting stud extending from one end of the junction housing and defining therein a plurality of female-socketed elements constructed and arranged for electrical connection to the original multiple-pronged terminal connector on the locomotive,

a receptacle at the other end of the junction housing enclos-

ing a second multiple-pronged terminal connector that is a duplicate of the original multiple-pronged terminal connector on the locomotive, the second multiple-pronged terminal connector being electrically connected to said female-socketed elements,

an elongated permanently mounted jumper cable originating at one end thereof from the aperture in the side wall means of the junction box and providing at its other end a free head that includes a second mounting stud with electrical connections that are a duplicate of the electrical connections of the first mounting stud at the one end of the junction box,

electrical connection means, located within the space enclosed by the junction box and extending through the permanently mounted jumper cable for electrically connecting the female socketed elements of the two mounting studs and the multiple-pronged terminal connector carried on the other end of the junction box,

means operatively associated with the junction box for rigidly mounting the junction box on the locomotive with the female socketed elements of the first mounting stud electrically coupled to the multiple prongs of the original terminal connector on the locomotive unit, and

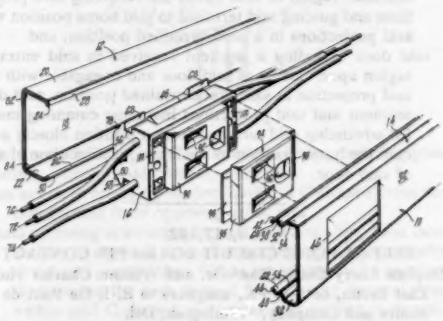
a dummy receptacle physically and electrically separated from said first receptacle and mounted on said locomotive unit adjacent the other side thereof, to provide a storage receptacle where the free head of the elongated cable may be selectively entered therein to be held when the jumper cable is not in use.

4,017,137

ELECTRICAL RACEWAY AND RECEPTACLE ASSEMBLIES

William E. Parks, Plantsville, Conn., assignor to The Wiremold Company, West Hartford, Conn.

Filed Jan. 16, 1976, Ser. No. 649,787
Int. Cl.[3] H01R *13/60*
U.S. Cl. 339—21 R **20 Claims**



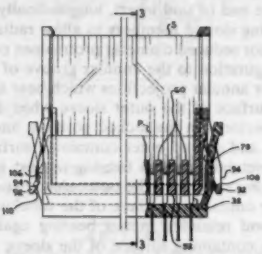
13. An electrical receptacle assembly comprising a receptacle having a plug prong-receiving face, a receptacle face cap dimensioned and configured to be mounted in fixed overlying relation to the receptacle face, and a receptacle cover plate having an opening registrable with the receptacle face and, alternatively, both the receptacle face and its overlying face cap, the face cap having retaining means projecting therefrom which when assembled is in interposed trapped relation between the cover plate and the receptacle and serves to secure the face cap against movement in fixed overlying relation to the face of the receptacle.

4,017,138

SUBSTRATE CONNECTOR

Robert Franklin Evans, New Cumberland, Pa., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed June 16, 1975, Ser. No. 587,228
Int. Cl.[2] H05K *1/07;* **H01R** *13/54*
U.S. Cl. 339—75 MP **7 Claims**



1. An electrical connector for receiving a substrate having a plurality of conductive pads along a surface adjacent an edge thereof comprising:

a first housing including a base having a pair of upstanding walls forming a channel, a releasable latch arm mounted on each end of the base of said housing, each latch arm including a latching surface extending from a side away from the channel and a latch release member on the free end of each arm, and a latch surface on each end of each wall spaced a distance away from said base and said latch surface on each said latch arm,

a plurality of cantilever contacts mounted in said base of said housing extending into said channel, and

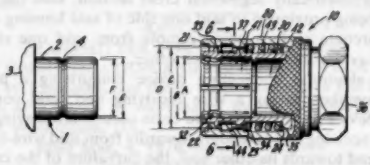
a member for receiving the substrate operatively mounted in said channel, said member including a base having an aperture receiving each contact and a surface on the base of said member for receiving an edge of the substrate having conductive pads on adjacent surfaces including a latch arm medially mounted on each end of the base of said member, each said arm on said member having a first free end including a first latch surface operatively engageable with said latch surface on one end of each wall of said housing in a loading position in which said member and said housing are engaged for receiving the substrate with zero contact insertion force against the conductive pads, and a second latch surface operatively engageable with said latch surface on one of said releasable latch arms on said housing in a loaded position in which the substrate, said member and said housing are engaged with a graduated force, wiped electrical connection between each contact and each conductive pad.

4,017,139

POSITIVE LOCKING ELECTRICAL CONNECTOR

Wilfred Nelson, Laguna Hills, Calif., assignor to Sealectro Corporation, Mamaroneck, N.Y.

Filed June 4, 1976, Ser. No. 692,891
Int. Cl.[3] F16L *37/08;* **H01R** *13/54, 13/56*
U.S. Cl. 339—91 R **7 Claims**



1. A female plug connector for use in combination with a standard male jack, said male jack including a tubular body

having an annular groove disposed intermediate its length, said female plug connector comprising:

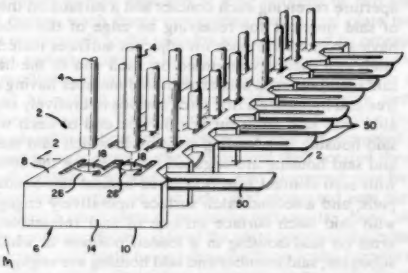
a. a tubular outer sleeve including:
   i. an annular edge at one end;
   ii. an interior locking surface of reduced diameter; and
   iii. first and second interior containing surfaces;
b. a tubular insert slidably received in the outer sleeve, said tubular insert including:
   i. at one end of said insert, longitudinally extending slits forming slotted members to allow radial expansion;
   ii. interior reduced diameter protrusions corresponding in configuration to the annular groove of the jack.
   iii. outer annular projections which bear against the locking surface of the outer sleeve when the female plug connector is in the locked position; and
   iv. first and second outer containing surfaces;
c. a first retaining means bearing against the first interior containing surface of the outer sleeve and the first outer annular containing surface of the tubular insert;
d. a second retaining means bearing against the second interior containing surface of the sleeve and the second outer annular containing surface of the tubular insert;
e. biasing means disposed between the first and second retaining means for locating the outer sleeve in its normal position relative to the tubular insert; and
f. a retaining ring disposed around the slotted members of the tubular insert, between the outer annular projections of the tubular insert and the first retaining means.

4,017,140

WIRE-IN-SLOT ELECTRICAL CONNECTIONS

Robert Philmore Reavis, Jr., Statesville, and Melvin Andrew Soderstrom, Advance, both of N.C., assignors to AMP Incorporated, Harrisburg, Pa.

Filed Oct. 28, 1975, Ser. No. 625,810
Int. Cl.² H01R 9/08
U.S. Cl. 339—98 **7 Claims**



1. Connecting means for forming an electrical and mechanical connection with a wire comprising:

an insulating housing,

a wire receiving cavity extending into said housing from one side thereof,

a connecting device cavity extending into said housing from a side which is adjacent to said one side, said connecting device cavity having a flat surface and an arcuate surface, said arcuate surface being opposed to said flat surface so that said connecting device cavity has a substantially geometrically segmental cross section, said flat surface being proximate to said one side of said housing and said arcuate surface being remote from said one side, said cavities intersecting each other,

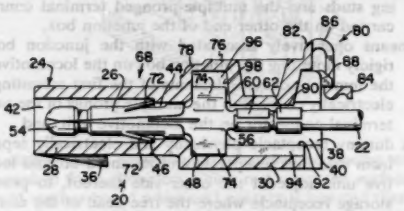
an electrical connecting device comprising a plate-like member having a wire receiving end, said connecting device having an arcuate cross section and having a wire-receiving slot extending inwardly from said wire-receiving end towards its other end, the curvature of the cross-section of said connecting device conforming to the curvature of said arcuate surface of said connecting device cavity whereby, upon inserting said wire into said wire-receiving cavity and inserting said connecting device into said connecting device cavity, wire receiving end first, said wire will move relatively into said slot.

4,017,141

CONNECTORS WITH PRIMARY AND SECONDARY LOCK STRUCTURE

Allen J. Bury, 400 Etowah, Prospect Heights, Ill. 60070, and William D. Gruhn, Jr., 408 Hillcrest Lane, Lombard, Ill. 60148

Filed May 23, 1973, Ser. No. 363,310
Int. Cl.² H01R 9/08
U.S. Cl. 339—217 S **4 Claims**



1. An electrical connector comprising in combination:

a housing formed of insulating material and including a main body portion and a hinged door portion movable to closed and open positions;

at least one terminal-receiving cavity extending through said main body portion, said cavity including an entrance region;

a conductive terminal insertable into said cavity from said entrance region to a home position;

said terminal comprising a generally cylindrical body having a pair of projections extending radially from said terminal and lying approximately in a plane including the center of said body;

primary lock means on said terminal and main body portion effective upon movement of said terminal to the home position for retaining the terminal in place;

guide groove means in said main body portion along the entrance region of said cavity for receiving said projections and guiding said terminal to said home position with said projections in a predetermined position; and

said door including a segment received in said entrance region upon closing of said door and engagable with one said projection in said predetermined position, said door segment and said projections including camming means for advancing said terminal from a position closely adjacent the home position to the home position upon closing of said door.

4,017,142

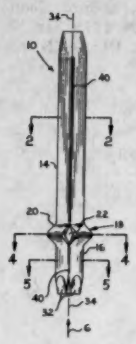
SELF-STAKING CIRCUIT BOARD PIN CONTACT

Stephen Larry Clark, Rossville, and William Charles Thoms, East Berlin, both of Pa., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 558,421, March 14, 1975, abandoned. This application Jan. 12, 1976, Ser. No. 648,514
Int. Cl.² H01R 9/08
U.S. Cl. 339—220 T **25 Claims**

10. A contact formed from flat metal stock and having a longitudinal axis, said contact comprising an outer hollow body at one end of the contact, a tubular mounting portion at the other end of the contact, a collapsible portion between said body and mounting portion, means at the free end of the mounting portion engagable with a support, and an inner elongate body surrounded by said outer hollow body, said inner elongate body extending past the collapsible portion and

into the interior of the mounting portion to move the means into engagement with a support upon collapse of said collapsible portion, and a longitudinal seam extending along said outer hollow body, said inner elongate body joining said outer body through a reverse bend portion at the seam.

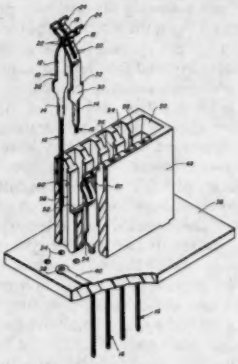


4,017,143

SOLDERLESS ELECTRICAL CONTACT

Robert Gordon Knowles, Litchfield, Conn., assignor to Litton Systems, Inc., Beverly Hills, Calif.

Filed Dec. 16, 1975, Ser. No. 641,386
Int. Cl.² H05K 1/12
U.S. Cl. 339—221 R 9 Claims



1. An electrical contact for insertion into a mounting plane aperture wherein said contact comprises:

an aperture engaging section having a C-shaped cross section formed from opposing arms; and

said opposing arms engaging said aperture along their outer surface to the ends thereof and tapering over a circumferential arc greater than 90° to a reduced cross-sectional thickness at the ends thereof for reducing internal stress within said C-shaped section as said section is inserted into said aperture.

4,017,144

RECORDING ASSEMBLY FOR VOLUME HOLOGRAPHY

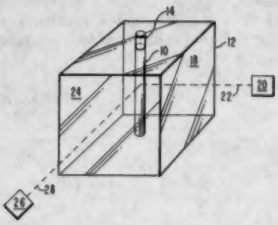
David Lloyd Staebler, Lawrenceville, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Feb. 11, 1976, Ser. No. 657,032
Int. Cl.² G03H 1/02
U.S. Cl. 350—3.5 5 Claims

1. A holographic recording assembly, comprising:

a transparent block having a cavity therein, a side of said block being planar; and

a holographic recording medium having the shape of a solid of revolution and an index of refraction substantially equal to the index of refraction of said block, said medium being axially rotatable within said cavity, the shapes of said cavity and said medium being substantially complementary.

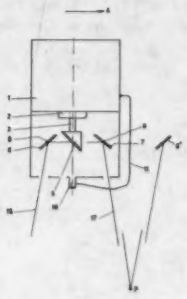


4,017,145

DEVICE MOUNTABLE IN A CRAFT FOR THE RECORDING OF DATA FROM A REMOTE OBJECT

Hans Georg Jerie, Enschede, Netherlands, assignor to Stichting Internationaal Instituut voor Luchtkaartering en Aarkunde (ITC), Enschede, Netherlands

Filed Apr. 29, 1975, Ser. No. 572,901
Claims priority, application Netherlands, May 9, 1974, 7406227
Int. Cl.² G02B 27/17
U.S. Cl. 350—7 3 Claims



1. In a device arranged to record data from a remote object constituted by a surface while being moved in a given direction relative to such surface, the device including a primary element mounted for continuous rotation about a main axis and presenting a radiation reflecting surface oriented at a fixed angle of 45 degrees to the main axis and the main axis being substantially perpendicular to the surface, the improvement wherein said device further comprises a first plane mirror permanently disposed on one side of said main axis a second plane mirror permanently disposed on the opposite side of said main axis, at least one of said mirrors being oriented so that its reflecting surface extends at an angle unequal to 45° to the main axis, and two pivotally mounted mirror support shafts each carrying a respective one of said plane mirrors and each lying in a plane which is perpendicular to the main axis.

4,017,146

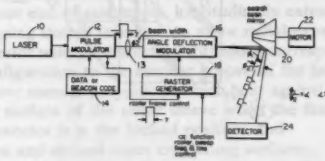
TRANSMITTER FOR USE IN A LASER COMMUNICATION AND RANGING SYSTEM

Samuel W. Lichtman, San Diego, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Mar. 4, 1976, Ser. No. 663,884
Int. Cl.² G02B 27/17
U.S. Cl. 350—7 5 Claims

1. For use in a laser communication and ranging system a transmitter for extending the operational range capability comprising:

a. a laser beam source;
b. pulsed modulator means for receiving said laser beams and providing a modulated beam output containing encoded data;
c. optical focusing means for receiving said modulated beam for focusing said beam to a predetermined narrow beam width,

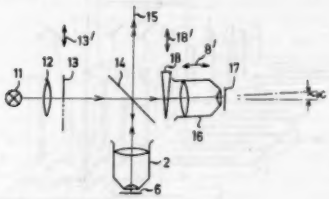


d. angle deflection modulator means for receiving said beam and deflecting said beam in a predetermined raster scan of an operational area equivalent to a broad beam scan, said angle deflection means including a ramp generator coupled to said pulse modulator and being triggered by the onset and for the duration of each beam pulse;
e. search scan mirror means for reflecting said beam to an area of interest.

4,017,147
COMPARISON MICROSCOPE

Klaus Weber, Konigsbronn, and Lothar Trapp, Heidenheim (Brenz), both of Germany, assignors to Carl Zeiss-Stiftung, Wuerttemberg, Germany

Filed Feb. 10, 1975, Ser. No. 548,672
Claims priority, application Germany, Feb. 15, 1974, 2407270
Int. Cl.² G02B *21/18*
U.S. Cl. 350—30 **7 Claims**



1. In a comparison microscope for the simultaneous observation of two objects, optical-element means including a first microscope objective on an observation-light path to a first object, a partially transmitting mirror arranged in and inclined with respect to the observation-light path, illuminating means offset to one side of said mirror, including a light source and a diaphragm having a straight edge defining the border between a light-transmitting area and a light-blocking area, said diaphragm being positioned with its light-transmitting area asymmetrical to the axis of light from said light source to said mirror, said mirror being positioned to reflect light from said source on the observation-light path through said microscope objective, whereby an image of the first object is viewable on the observation-light path as light transmitted via said first objective and through said mirror, part of the light from said source passing through said mirror and generally transverse to said observation-light path, a second microscope objective having its axis so positioned in the path of light-source light transmitted through said mirror as to illuminate a second object and to cause light reflected by the second object to place an image of the second object as a reflection from said mirror on the observation-light path, the axis of said second microscope objective being so tilted with respect to the axis of light from said source to said mirror that the image of the second object is viewable directly adjacent the image of the first object within that part of the field of view which is not illuminated by the light coming through said diaphragm.

4,017,148
TRI-POWER PERISCOPE HEAD ASSEMBLY

William H. Taylor, South Deerfield, Mass., assignor to Kollmorgen Corporation, Hartford, Conn.

Filed July 16, 1975, Ser. No. 596,515
Int. Cl.² G02B *7/04*
U.S. Cl. 350—37 **4 Claims**

1. An optical system for a periscope head assembly, said optical system having an optical axis and comprising:
a. a first telescopic lens assembly aligned with said optical axis for altering the magnification of said optical system, said first lens assembly having two positions, both of which transmit light, the alteration of the magnification of said optical system by said first lens assembly being effected by rotating said first lens assembly approximately 180° in a plane substantially parallel to said optical axis;
b. a second telescopic lens assembly aligned with said optical axis for altering the magnification of said optical system, said second lens assembly having two positions, both of which transmit light, said second lens assembly being in series with said first lens assembly, said first and second lens assemblies forming a part of the optical path regardless of the magnification selected, the alteration of the magnification of said optical system by said second lens assembly being effected by rotating said second lens assembly by approximately 180° in a plane substantially parallel to said optical axis, said first and second lens assemblies providing, in combination, three different optical magnifications; and
c. an objective lens assembly aligned with said optical axis for receiving optical information transmitted serially by said first and second lens assemblies.

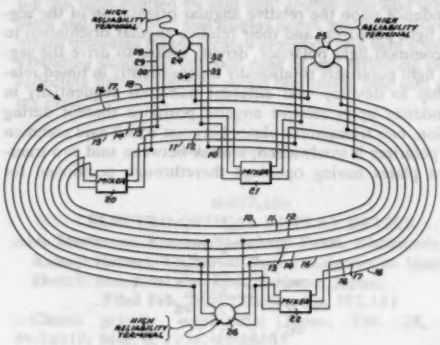
4,017,149
MULTIPLE ACCESS FIBER OPTICAL BUS COMMUNICATION SYSTEM

Charles K. Kao, Southwest Roanoke, Va., assignor to International Telephone and Telegraph Corporation, Nutley, N.J.

Filed Nov. 17, 1975, Ser. No. 632,614
Int. Cl.² G02B *5/16*; H04B *9/00*
U.S. Cl. 350—96 C **18 Claims**

1. A low loss fiber optical bus communication system comprising:
a plurality of optical transmission lines, each of which is formed into a closed loop;
a finite number of transmission line optical mixers operatively interconnected to a discrete number of said optical transmission lines, each of said mixers being independent of each other and forming a finite number of independent mixer transmission line loops; and
one or more optical access terminals connected to said

transmission lines by being interconnected to at least one transmission line associated with at least one of said



mixers said optical access terminals exceeding said finite number of transmission line optical mixers.

4,017,150

WIDE-ANGLE ILLUMINATING OPTICAL SYSTEM WITH LIGHT GUIDE

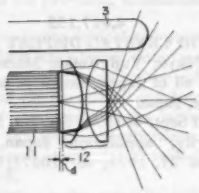
Toshihiro Imai, Hachiouji, Japan, assignor to Olympus Optical Co., Ltd., Tokyo, Japan

Filed Oct. 7, 1975, Ser. No. 620,503

Claims priority, application Japan, Oct. 8, 1974, 49-115872; Nov. 6, 1974, 49-127833

Int. Cl.² G02B 5/16

U.S. Cl. 350—96 BC **4 Claims**



1. A wide-angle illuminating optical system with light guide comprising:

a light guide for transmitting the illuminating light and a positive lens system arranged near the end of said light guide,

said wide-angle illuminating optical system with light guide being arranged to illuminate a wide area of the portion to be observed by converging the illuminating light from said light guide at the back focal point of said positive lens system and, then, diverging said light,

said illuminating optical system satisfying the following conditions:

$$f/l < 0.866 \quad (1)$$

$$d < \tfrac{1}{4} f \quad (2)$$

wherein

reference symbol l represents the diameter of said light guide,

reference symbol d represents the airspace between the end face of said light guide and the first lens surface of said positive lens system, and

reference symbol f represents the focal length of said positive lens system.

4,017,151

BICYCLE SIDE REFLECTOR

Jo Kagayama, Osaka, Japan, assignor to Tsuyama Mfg. Co., Ltd., Osaka, Japan

Filed Nov. 3, 1975, Ser. No. 628,556

Int. Cl.² G02B 5/12

U.S. Cl. 350—99 **8 Claims**

1. A side reflector assembly for mounting on spokes of a wheel comprising two slim and elongated reflector bodies having a longitudinal axis adapted to be oriented generally parallel to a rim of a wheel upon which the reflector assembly is to be mounted, each reflector body made from molded material and each having a front reflective surface and a rear face faceted with prismatic reflector elements, said bodies being seamed together to form said assembly, said front reflective surface being comprised of at least a first planar surface and a second roof surface having two inclined planar sections symmetrical to the longitudinal axis of the assembly, and means for clamping said assembly to a wheel spoke.

4,017,152

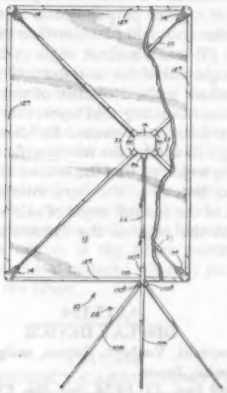
PORTABLE PROJECTION SCREEN

William P. Allen, P.O. Box 702, Portland, Oreg. 97207

Filed May 14, 1975, Ser. No. 577,230

Int. Cl.² G03B 21/56

U.S. Cl. 350—117 **18 Claims**



1. A portable projection screen comprising

a sheet of flexible material, and

sheet support means including a central hub member, at least three elongate rods having inner and outer ends, means on said hub member of detachably connecting the inner set of ends of said rods to said hub member with said members radiating outwardly therefrom at substantial angles relative to each other and with the outer set of

ends of said rods occupying a substantially common plane, spaced-apart connector means on said sheet adjacent marginal edges thereof for releasably connecting outer end portions of said rods to said sheet, said connector means being so positioned on the sheet that when said rod ends are connected thereto in operative positions the sheet is tensed, and said sheet being collapsible upon release of said rods from said connector means.

4,017,153
POLARIZATION ANALYZERS AND DUPLEXERS

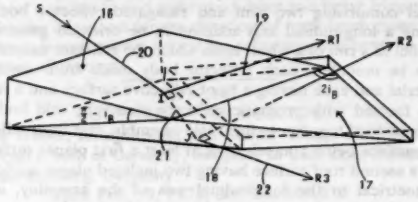
René Sardos, Bordeaux, France, assignor to Agence Nationale de Valorisation de la Recherche (ANVAR), Neuilly sur Seine, France

Continuation-in-part of Ser. No. 469,766, May 14, 1974, abandoned. This application June 26, 1975, Ser. No. 590,841

Claims priority, application France, May 18, 1973, 73.19248

Int. Cl.² G02B *5/30, 27/28, 5/04*

U.S. Cl. 350—152 **6 Claims**



1. A polarization analyzer comprising a first substantially non-absorbent dielectric prismatic layer defining, at one side, a first interface, and at the other side a second interface, said second interface determining with said first interface a summit angle of $\pi/2 - iB$, iB being the Brewsterian angle value for a reflection against a diopter whose first medium is the medium surrounding said layer and second medium is the dielectric of the layer, a second substantially non-absorbent dielectric prismatic layer defining, at one side, a first interface and at the other side, a second and a third side disposed symmetrically to opposite sides of a plane perpendicular to said first interface so as to determine with said first interface two opposite angles equal to $\pi/2 - i'B$ and a summit angle of $2i'B$, $i'B$ being the Brewsterian angle value for a reflection against a diopter whose first medium is the dielectric of the layer and second medium is that surrounding said layer, said layers having the same refractive index, and means for directing an incident wave at the angle iB against the first interface of the first layer, said layers being so joined that the second interface of the first layer is applied directly to the third interface of the second layer, the edge of the summit angle of said second layer being orthogonal with the edge of the summit angle of said first layer.

4,017,154
DISPLAY DEVICE

Masanori Kobayashi, Yachiyo, Japan, assignor to Kabushiki Kaisha Seikosha, Japan

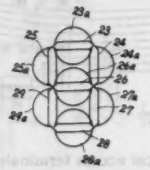
Filed Dec. 23, 1974, Ser. No. 535,208

Claims priority, application Japan, Dec. 25, 1973, 49-3930; July 8, 1974, 49-80430[U]; July 24, 1974, 49-84755; Sept. 13, 1974, 49-105782; Sept. 9, 1974, 49-103598; Sept. 13, 1974, 49-105783

Int. Cl.² G04B *19/06*

U.S. Cl. 350—159 **2 Claims**

1. A display device comprising, a plurality of segment light polarizers mounted for receiving incident light thereon and for rotation independently and positioned to jointly define different numerals sequentially in dependence upon their relative angular orientation, a common light polarizer mounted forwardly of said plurality of segment light polarizers and common thereto for polarizing light from said segment light polarizers and for viewing of said different numerals thereon in dependence upon the relative angular orientation of the segment light polarizers and their relative angular orientation to said common light polarizer, driving means to drive the segment light polarizers rotationally independently in timed relationship to develop said different numerals sequentially in dependence upon relative angular positions thereof during rotation, two transparent plates between which said common light polarizer is sandwiched, a mask between said two transparent plates having openings therethrough positioned for



viewing of the corresponding individual segments of said numerals on said common light polarizer, said openings being shaped to correspond in configuration with corresponding segment light polarizers, and said driving means positioning said corresponding segment light polarizers in registry with corresponding openings, whereby said numerals are sharply defined, said mask having other openings arranged circularly, angularly spaced, a disc spaced from said mask in said device and having an opening therethrough rotated into registry with said other openings, a light source for transmitting light through the opening in said disc, and means in said driving means for driving the last-mentioned disc in timed relationship with said segment light polarizers.

4,017,155
LIQUID CRYSTAL DISPLAY DEVICE

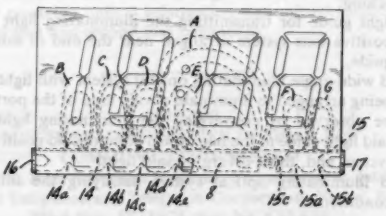
Kenjiro Yagi, Tokyo; Yuji Koike, Matsudo, and Hirotomo Hirai, Tokyo, all of Japan, assignors to Kabushiki Kaisha Daini Seikosha, Japan

Filed Sept. 6, 1974, Ser. No. 503,610

Claims priority, application Japan, Sept. 7, 1973, 48-100898; Sept. 21, 1973, 48-110675[U]; Sept. 21, 1973, 48-110676[U]

Int. Cl.² G02F *1/13*

U.S. Cl. 350—160 LC **7 Claims**



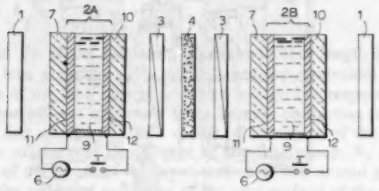
1. A liquid crystal display device suitably thin and compact for use in wrist watches and the like comprising: a display panel comprised of upper and lower transparent plates having liquid crystal material sandwiched therebetween; a reflecting plate disposed beneath said lower transparent plate and having a roughened upper surface facing said lower transparent plate; an energizeable light source disposed laterally adjacent one side edge of said reflecting plate and positioned to direct light when said light source is energized through said reflecting plate; and light-distributing means substantially encasing

said display panel, reflecting plate and light source except for said upper transparent plate and forming therewith a thin and compact liquid crystal display device for effectively distributing the light emitted by said light source into said reflecting plate and throughout said display panel, said light-distributing means including means located alongside said light source and extending along said one side edge of said reflecting plate for reflecting light at discrete points therealong into said reflecting plate.

4,017,156
ELECTRO-OPTICAL DISPLAY DEVICE

Akio Moriyama, Katano; Masakazu Fukai, Nishinomiya, and Katsuji Hattori, Uji, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan

Filed Feb. 24, 1975, Ser. No. 552,151
Claims priority, application Japan, Feb. 28, 1974, 49-24010; Mar. 6, 1974, 49-26503
Int. Cl.² G02F 1/13
U.S. Cl. 350—160 LC **1 Claim**



1. An electro-optical display device of the transmissive type which comprises:

a linear polarizer for providing substantially linearly polarized light;

a twisted nematic electro-optical cell positioned in the path of the light from said linear polarizer and capable of changing the state of polarization of said light, said twisted nematic electro-optical cell being composed of a pair of spaced transparent plates with a nematic liquid crystal filling the space therebetween and said plates having transparent electrodes provided on the opposed surfaces thereof;

a ¼-spectrum plate on the opposite side of said twisted nematic electro-optical cell from said linear polarizer for exhibiting one-quarter wave length retardation and producing circularly polarized light as its output;

a cholesteric liquid crystal film on the opposite side of said ¼-spectrum plate from said cell for selectively reflecting light of a specific wave length and exhibiting circular dichromism;

means coupled to said cell for supplying an electric field to the nematic liquid crystal and including switch means for connecting and disconnecting said means from said nematic liquid crystal;

a second ¼-spectrum plate on the opposite side of said cholesteric liquid crystal film from said first mentioned ¼-spectrum plate for receiving the light which is passed through said cholesteric liquid crystal film and for producing circularly polarized light as its output;

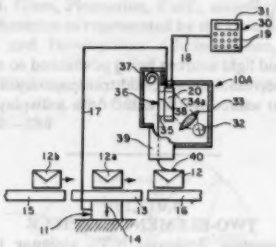
a second twisted nematic electro-optical cell on the opposite side of said second ¼-spectrum plate from said cholesteric liquid crystal film for changing the state of polarization of light from said second ¼-spectrum plate; and

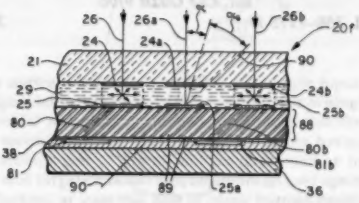
a second linear polarizer on the other side of said second twisted nematic electro-optical cell from said second ¼-spectrum plate for receiving the light from said second twisted nematic electro-optical cell and providing substantially linearly polarized light.

4,017,157
APPARATUS FOR THE DIGITAL DISPLAY OR RECORDING OF DATA

Aloysius Johannes van Riet, Rijswijk, Netherlands, assignor to Maatschappij Van Berkel's Patent N.V., Rotterdam, Netherlands

Filed Mar. 26, 1975, Ser. No. 562,238
Claims priority, application Germany, Mar. 26, 1974, 2414368; Dec. 23, 1974, 2461253; Dec. 23, 1974, 2461239
Int. Cl.² G02F 1/13
U.S. Cl. 350—160 LC **18 Claims**





1. An apparatus for producing data for display and/or recording purposes, said apparatus comprising: a liquid crystal cell having a pair of light transparent parallel spaced walls, said cell having an input side on one side of the cell at one of said walls and an output or display side on the opposite side thereof at the other of said walls, light transparent electrodes on the facing sides of the walls profiled to produce alphanumerical data and/or machine-readable code marks, a source of light producing parallel light rays on the input side of the cell, means for addressing the electrodes in accordance with given information, a liquid crystal material between the walls, and a fiber-optic plate on the output side of the cell having a plurality of parallel arranged optical fibers embedded in a light-absorbing material, wherein the angle of inclination between the light rays produced by said source and the axes of the optical fibers exceeds the limit angle for which total reflection of light rays occurs in the fibers passing undisturbed through the liquid crystal material whereby such light rays do not pass through the fibers.

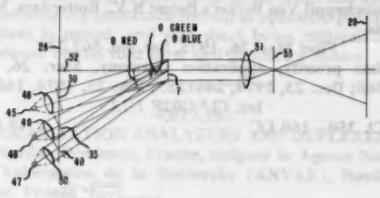
4,017,158
SPATIAL FREQUENCY CARRIER AND PROCESS OF PREPARING SAME

Bruce Lee Booth, Hockessin, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Mar. 17, 1975, Ser. No. 559,168
Int. Cl.² G02B 27/38; G03H 1/02
U.S. Cl. 350—162 SF **2 Claims**

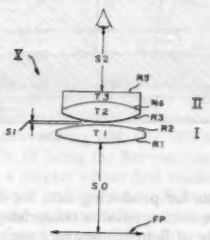
1. An optical viewer having a plurality of light sources which are independently variable as to color and intensity, mounted in said optical viewer, a film-like transparency from about 50 to about 200 microns in thickness having a plurality of mutually exclusive areas, each individual area containing

differently oriented spatial frequency carriers formed of a photopolymerized organic resin, said spatial frequency carriers having a spacing of from 200 to 2,000 lines per millimeter,



and each of said light sources being positioned so as to cooperate with an individual area of said transparency whereby light from said light source is diffracted onto a display.

4,017,159
TWO-ELEMENT EYEPIECE
Milton H. Sussman, Amherst, N.Y., assignor to American Optical Corporation, Southbridge, Mass.
Filed Feb. 9, 1976, Ser. No. 656,764
Int. Cl.² G02B *9/06*
U.S. Cl. 350—175 E **2 Claims**



1. A two-element eyepiece having a magnification of substantially 10X, a field of view of approximately 40° and eye relief of approximately 80 percent of the effective focal length which comprises a biconvex positive singlet as the first element and a convex-plano positive doublet as the second element, said lens elements having the following values:

Lens	Radius	Thickness	Space	Refraction	Abbe Number
			S_0= 1.0331x		
	R_1 1.5796x				
I		T_1= 0.2057x	1.52<N-D_1<1.53	ν_1≅58	
	R_2=		S_1=0.021-74x		
	−1.5796x				
	R_3= 1.0626x				
		T_2= 0.2341x	1.52<N-D_2<1.53	ν_2≅58	
II	R_4= −1.0626x				
		T_3= 0.1087x	1.78<N-D_3<1.79	ν_3≅25	
	R_5=∞		S_2=		

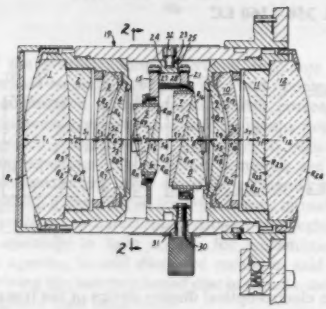
-continued

Lens	Radius	Thickness	Space	Refraction	Abbe Number
			0.8609x		

where x=20 to 26mm

wherein the minimum amount of surface curvatures and lens elements provide good correction for field curvature, distortion and lateral color aberrations.

4,017,160
CONTINUOUSLY VARIABLE ANAMORPHIC LENS
Ellis I. Betensky, Toronto, Canada, assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.
Filed Sept. 19, 1975, Ser. No. 614,900
Int. Cl.² G02B *13/10*
U.S. Cl. 350—182 **3 Claims**



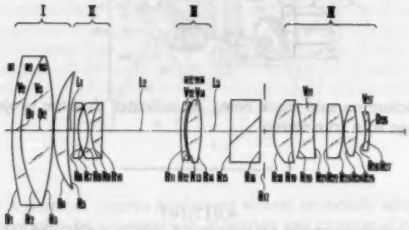
1. A continuously variable anamorphic lens comprising:
a four element front lens group for collimating light,
a four element rear lens group for decollimating light,
a pair of achromatized prisms between said front and rear groups, said prisms being pivotable about parallel axes perpendicular to the axis of the lens, and
means for pivoting said prisms in a predetermined relationship,
said front and rear lens groups cooperating with said prisms to provide a primary magnification of from 0.8 to 1.2 and a continuously variable anamorphic magnification of from 0.9 to 1.0.

4,017,161
COMPACT ZOOM LENS
Sadahiko Tsuji, Yokohama, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan
Filed Feb. 3, 1976, Ser. No. 654,905
Claims priority, application Japan, Feb. 26, 1975, 50-24316
Int. Cl.² G02B *15/18*
U.S. Cl. 350—184 **7 Claims**

1. A compact zoom lens comprising : four lens groups optically aligned on a common axis, a first group (counting from the front) axially movable to effect focusing which remains stationary during zooming, said first group having a positive refractive power and being composed of a positive compound component and a positive simple component rearwardly spaced therefrom, said positive compound component being constituted by negative and positive lens elements in this order from the front, a second group having a negative refractive power axially movable behind said first group to effect variation of the equivalent focal length of the entire lens system, a third group having a positive refractive power axially movable behind said second group to effect compensation of the image

plane, said third group being composed of a negative component and a positive component spaced from each other in this order from the front, and a fourth group having a positive refractive power which serves as an image-forming lens, said zoom lens being characterized by the following relationships:

1. $Fw < |F_{II}| < 1.4Fw$; $F_{II} < 0$
2. $0.75F_I < R_2 < 0.95F_I$
3. $0.6F_I < R_4 < 0.8F_I$
4. $-10F_{II} < R_6 < \infty$
5. $0.3F_{III} < R_{12} < 0.5F_{III}$
6. $R_{12} < R_{13} < 1.2R_{12}$
7. $n_{14} < n_{12}$
8. $V_{12} < V_{14}$



wherein Fw is the minimum equivalent focal length of the entire lens system; F_I, F_{II} and F_{III} are the equivalent focal lengths of the first, second and third lens groups respectively; R_2 is the radius of curvature of the internal contacting surface in the first group; R_4 is the radius of curvature of the front surface of the rear component of the first group; R_6 is the radius of curvature of the front surface of the second group; R_{12} is the radius of curvature of the rear surface of the negative component of the third group; R_{13} is the radius of curvature of the front surface of the positive component of the third group; n_{12} and V_{12} are respectively the refractive index and Abbe number of the material from which the negative component of the third group is made, and n_{14} and V_{14} are respectively the refractive index and Abbe number of the material from which the positive component of the third group is made.

4,017,162

ADJUSTABLE SLIT MECHANISM

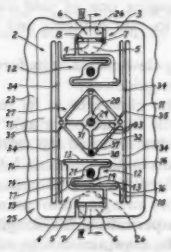
James Philip George Mills, Doncaster, Australia, assignor to Varian Techtron Pty. Ltd., Mulgrave, Australia

Continuation of Ser. No. 496,439, Aug. 9, 1974, abandoned. This application Jan. 26, 1976, Ser. No. 652,451

Claims priority, application Australia, Aug. 13, 1973, 4456/73

Int. Cl.² G01J *3/04;* **G05D** *25/00*

U.S. Cl. 350—271 **38 Claims**



1. An optical system slit mechanism including a plate defining two opposed and spaced jaw sections, and hinge means integral with and interconnecting said jaw sections; two substantially flat and parallel mounting surfaces arranged in opposed spaced relationship, at least part of each said jaw section being slidably located between said mounting surfaces and being confined thereby so as to maintain said jaw sections substantially coplanar with said plate during relative movement of said jaw sections; and actuator means connected to said plate and operable to cause relative movement of said jaw sections, and said hinge means being arranged to flex during said relative movement.

4,017,163

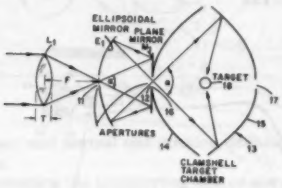
ANGLE AMPLIFYING OPTICS USING PLANE AND ELLIPSOIDAL REFLECTORS

Alexander J. Glass, Pleasanton, Calif., assignor to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed Apr. 16, 1976, Ser. No. 677,646

Int. Cl.² G02B *5/10, 17/00*

U.S. Cl. 350—294 **5 Claims**



1. An optical system for providing wide angle input beams into ellipsoidal target illumination systems comprising: a pair of ellipsoidal reflectors positioned to define a clamshell configured target chamber, each of said reflectors having apertures therein, a pair of lens assemblies positioned on opposite sides of said target chamber and aligned with said apertures of said reflectors, at least one pair of plane mirrors having apertures therein positioned on opposite sides of said target chamber intermediate said reflectors and said lens assemblies with said apertures being aligned with said apertures of said reflectors, and at least one pair of ellipsoidal mirrors having apertures therein positioned on opposite sides of said target chamber intermediate said reflectors and said lens assemblies with said apertures being aligned with said apertures of said reflectors, each of said ellipsoidal mirrors being positioned with respect to one of said plane mirrors such that said one plane mirror is adjacent a concave surface of said ellipsoidal mirror.

4,017,164

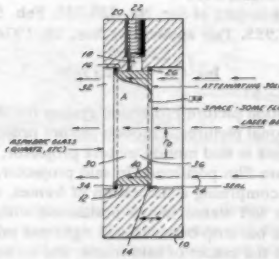
HIGH POWER LASER APODIZER

Robert L. Nolen, Jr., and Larry D. Siebert, both of Ann Arbor, Mich., assignors to KMS Fusion, Inc., Ann Arbor, Mich.

Filed Oct. 9, 1974, Ser. No. 513,340

Int. Cl.² G02B *5/24*

U.S. Cl. 350—312 **2 Claims**



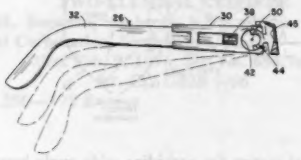
1. A dye cell for apodizing laser beams which comprises:

a. a supporting ring having an opening,
b. a pair of windows in said ring shaped to provide an annular chamber therebetween at the periphery of the opening in said ring,
c. means to seal said chamber to retain liquid, and
d. a solution in said chamber comprising copper nitrate in dimethyl sulfoxide and water mixed in such proportions that said solution has the same index of refraction as said windows at the operating temperature of said dye cell.

4,017,165
EYEGLASS FRAMES

James F. Davis, Muskogee, Okla., assignor to Frank S. Griffin, Vian, Okla., a part interest

Filed Sept. 22, 1975, Ser. No. 615,554
Int. Cl.² G02B 5/30
U.S. Cl. 351—153 **8 Claims**



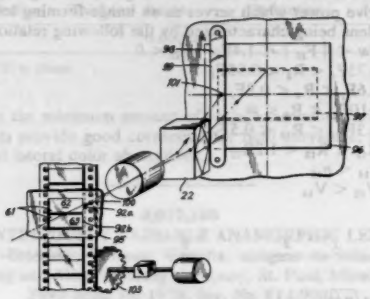
1. An eyeglass frame comprising a bow portion, earpiece members pivotally secured to each end of the bow portion and movable to alternate extended and contracted positions, and hinge means comprising substantially ball and socket shaped elements interposed between the bow portion and earpiece members providing said pivotal movement and securing the earpiece members to the bow portion for rotation about an axis substantially parallel with the longitudinal dimension of the bow portion, said substantially socket shaped element having elongated slot means provided therein, and outwardly extending pin means provided on said substantially ball shaped element for extending through said slot means for providing both the rotation of said bow portion and the movement of said earpiece members.

4,017,166
MOTION PICTURE FILM FOR THREE DIMENSIONAL PROJECTION

Arthur P. Kent, Forest Hills, and Mortimer Marks, Beechhurst, both of N.Y., assignors to Marks Polarized Corporation, Whitestone, N.Y.

Continuation-in-part of Ser. No. 329,733, Feb. 5, 1973, Pat. No. 3,851,955. This application Nov. 18, 1974, Ser. No. 524,798
Int. Cl.² G03B 35/00
U.S. Cl. 352—57 **2 Claims**

1. In a motion picture projection system for the projection of 3-dimensional pictures, a motion picture projector adapted therefor, a gate in said motion picture projector, a single strip motion picture film positioned in said projector, said motion picture film comprising a succession of frames, a right stereo image and a left stereo image positioned within each said frame, a dark bar strip between said right and said left images positioned at the center of said frame, and an indicium mark on said film to predetermine the location of the said right and left images in said gate, a projected image including an image of said indicium at an edge thereof, a reflecting mask at an edge of the projected image, the said mask blocking and displaying said indicium only, the reflected image of said

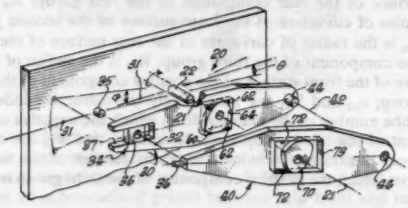


indicium on said mask being an indicator that the projected image is in true stereo.

4,017,167
INTERMITTENT MOVEMENT WITH TANDEM CAMS

George A. Mitchell, 687 Prospect Crescent, Pasadena, Calif. 91103

Filed Mar. 5, 1976, Ser. No. 664,155
Int. Cl.² G03B 1/22
U.S. Cl. 352—194 **3 Claims**

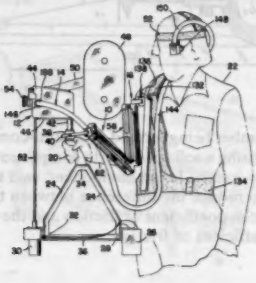


1. In a film intermittent movement the combination of
a frame providing a film guideway,
a driven shaft journaled in the frame rearwardly of the guideway
first and second cams each of constant diameter mounted on the shaft in approximately opposite phase relation,
a carrier arm,
means for mounting the carrier arm at its forward end for oscillatory swinging movement with respect to a first pivot axis and for longitudinal translational movement with respect to the frame,
cam follower means on the carrier arm intermediate its length and engaging one of said cams for driving the carrier arm in its said swinging and translational movements,
a claw arm having claw means at its forward end for engaging a film in the guideway,
means pivoting the claw arm at its rearward end on the carrier arm on a second pivot axis which is fixed with respect to the claw arm and the carrier arm,
cam follower means on the claw arm intermediate its length and engaging the other of said cams for driving the claw arm in oscillatory swinging movement about said second pivot axis while permitting free longitudinal translational movement of the claw arm due to said movement of the carrier arm,
said translational movement of the carrier arm causing said claw means to engage the film substantially throughout the swings of said arms opposite to the direction of drive of the shaft.

4,017,168
EQUIPMENT FOR USE WITH HAND HELD MOTION PICTURE CAMERAS

Garrett W. Brown, 1845 Walnut St., Philadelphia, Pa. 19103

Filed Sept. 16, 1974, Ser. No. 506,326
Int. Cl.² G03B 17/00
U.S. Cl. 352—243 69 Claims



1. A portable camera equipment system especially adapted for operation by a cameraman in motion and capable of being hand-guided, the system being of improved stability against angular deviations in pan, tilt and roll, and substantially free-floating in a manner to isolate the equipment also from unwanted lateral and vertical movement caused by the motion of the cameraman using the equipment which comprises;

camera equipment components positioned in an expanded balanced arrangement at points remote from each other and about a handle means for guiding the camera equipment which means is positioned at or approximately at the center of gravity and at or approximately at the center of the moment of inertia of the mass of the components comprising the expanded camera equipment;

camera equipment support means adapted to support at least part of the weight of the camera equipment which means is adapted to be pivotally and rotatably connected to the cameraman and is connected to the camera equipment, said means substantially freeing the cameraman's hands from the weight of the camera equipment, isolating and free-floating the camera equipment at a distance from the cameraman substantially independently of any of his unwanted lateral and vertical motions and capable of being guided to a position in space in a range of positions selected by the cameraman;

pivotable and rotatable means interconnecting the camera equipment with the support means to permit rotatable and pivotal movement of the camera equipment relative to the support means and which thereby virtually does not transmit deviations in the pan, tilt and roll axes from the cameraman to the camera equipment; and

view finding means adapted to indicate the field of view of the camera to the cameraman without the need for his eye to be in direct contact with the camera.

4,017,169
COPY PAPER TRANSPORTING UNIT FOR USE IN ELECTRO-PHOTOGRAPHIC COPYING APPARATUS

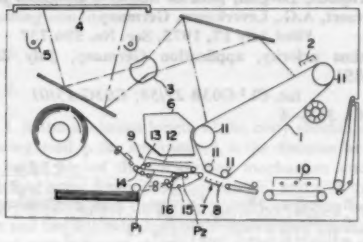
Masaru Komura, and Kenichi Arai, both of Toyokawa, Japan, assignors to Minolta Camera Kabushiki Kaisha, Azuchi, Japan

Filed May 20, 1975, Ser. No. 579,288
Claims priority, application Japan, May 31, 1974, 49-63737[U]
Int. Cl.² G03G 15/00
U.S. Cl. 355—3 R 10 Claims

1. In an electrophotographic copying apparatus having a housing, a photosensitive member on which a latent charge image is formed corresponding to an original image to be copied, a transfer station located adjacent the photosensitive member, and a copy paper supply system including a transporting unit for presenting copy paper intermediate the imaged photosensitive member and the transfer station for transferring the image from the photosensitive member to the copy paper, the improvement comprising

a support member within the housing adapted to be withdrawn therefrom, including locking means to prevent withdrawl of the support member from the housing,

a transfer device movably mounted on said support member in a normal position of rest adjacent said photosensitive



member, said normal rest position defining said transfer station,

means mounting the transporting unit on the support member, the transporting unit comprising a pair of rotary elements cooperating to define a copy paper transport path having an entrance and an exit, said exit being adjacent the transfer station, manual means to move the transfer device to a retracted position well-spaced from the photosensitive member, and

means operable to unlock said support member in response to moving the transfer device to the retracted position, thereby permitting withdrawl of the support member only when the transfer device is retracted,

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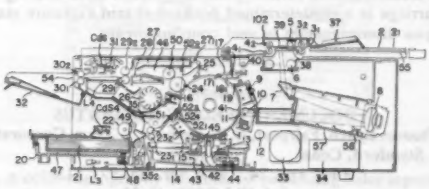
4,017,170
ELECTROPHOTOGRAPHIC DEVICE

Shigehiro Komori; Hisashi Sakamaki, both of Yokohama; Hiroyuki Hattori, Mitaka; Toshihide Iida; Koichi Miyamoto, both of Tokyo, and Kazumi Umezawa, Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 348,092, April 5, 1973, abandoned.
This application July 31, 1975, Ser. No. 600,860
Claims priority, application Japan, Apr. 13, 1972, 47-37288; Apr. 15, 1972, 47-38149; June 20, 1972, 47-72961[U]
Int. Cl.² G03G 15/00
U.S. Cl. 355—3 R 4 Claims



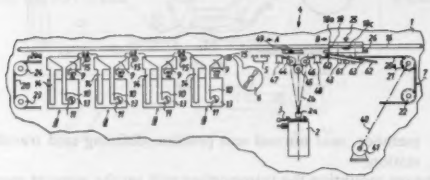
1. An electrophotographic copying device comprising a photosensitive member, charging means and exposing means for forming an electrostatic latent image on said photosensitive member, developing means for visualizing said electrostatic latent image, means for fixing said visible image, means for transporting copying paper, means for transferring said

visible image onto said copying paper, and means for making the surface potential of the photosensitive member substantially uniform after the termination of a copying cycle and before the complete cessation of operation of the device.

4,017,171
APPARATUS FOR MAKING COPIES OF MULTI-COLORED ORIGINALS

Richard Wick, Munich; Friedrich Bestenreiner, Grunwald; Dieter Gigiberger, Unterhaching; Günter Wetzel, Haar; Walter Schott, Zorndeding, all of Germany; Jozef Leonard V. Engeland, St. Katelijne-Waver, and Willy Gommaire Verlinden, Edegem, both of Belgium, assignors to AGFA-Gevaert, A.G., Leverkusen, Germany

Filed July 17, 1975, Ser. No. 596,737
Claims priority, application Germany, July 25, 1974, 2435851
Int. Cl.² G03B *27/58*; G03G *15/01*
U.S. Cl. 355—4 **7 Claims**



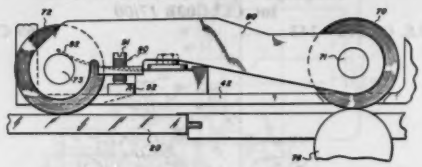
1. In a color copying apparatus wherein the image of an original is repeatedly exposed onto a sheet-like copy carrier at an exposure station and the copy carrier is moved to a different one of several developing units subsequent to each exposure, a combination comprising a carriage having means for supporting a copy carrier thereon; guide means defining for said carriage an elongated path extending along said exposure station and said developing units; drive means for said carriage, including an endless flexible element and means for moving said flexible element along a fixed path; coupling means normally connecting said carriage to said drive means and comprising a first coupling member in form of a pin on said flexible element and a complementary second coupling member on said carriage and having two spaced-apart parallel open slots normal to said elongated path; a roller adjacent to the path of movement of said second coupling member with said carrier for guiding a portion of said flexible element in parallelism with said slot, said roller having a diameter at least substantially equal to the distance between said slots; means for automatically disengaging said coupling means when the carriage reaches said exposure station, comprising a device which defines for said first coupling member at least one further path which is normal to said elongated path so that said carriage is at a standstill while said first coupling member is located in said further path; and means for centering said carriage in a predetermined position at said exposure station upon disengagement of said coupling means.

4,017,172
DOCUMENT FEEDING APPARATUS

Thomas Lynch, Fairport, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Apr. 24, 1975, Ser. No. 571,113
Int. Cl.² G03G *15/30*
U.S. Cl. 355—8 **11 Claims**

1. A moving document exposure apparatus comprising:
a viewing platen;
a photosensitive surface arranged for movement;
means for viewing a document at said platen and for projecting an image thereof onto said photosensitive surface;
means for feeding said document over said platen and past said viewing means in synchronism with the movement of said photosensitive surface, said feeding means including at least one feed member urged against said platen to form a nip therebetween for passage of said document,

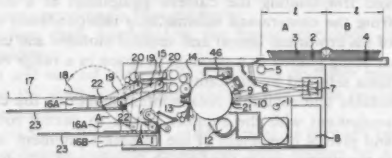


said feed member being formed of a multi-component material comprising a solid polymeric component impregnated with a non-volatile liquid component, said material being selected to reduce the difference between the feed member-to-platen coefficient of friction and the document-to-platen coefficient of friction.

4,017,173
COPYING APPARATUS FOR COPYING A PLURALITY OF ORIGINAL SURFACES WITH A SINGLE SCAN

Shigehiro Komori; Hisashi Sakamaki, both of Yokohama; Masao Ariga, Chofu; Hiroshi Nitanda, and Seigi Nagasawa, both of Tokyo, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 31, 1974, Ser. No. 537,641
Claims priority, application Japan, Jan. 11, 1974, 49-6459; June 7, 1974, 49-65253
Int. Cl.² G03G *15/28*
U.S. Cl. 355—8 **13 Claims**

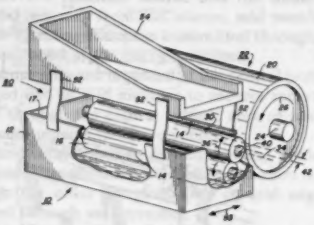


1. A copying apparatus comprising:
an original carrier having a surface defining first and second contiguous areas for retaining thereon an original corresponding dimensionally to the combined area of two surfaces of a desired copy size;
a photosensitive member;
optical scanning means for scanning the entire area of the original by sequentially scanning the portions of the original retained respectively on said first and second contiguous carrier areas as said scanning means transverses first and second portions of an elongated scanning path, wherein each of said portions extends across one of said contiguous areas;
means for forming an electrostatic image of the original on said photosensitive member;
means for developing the electrostatic image;
means for transfering the portions of developed image defined by the first and second portions of the scanning path onto separate copy material surfaces; and
means for feeding copy material to said transferring means.

4,017,174
DEVELOPER ASSEMBLY SUPPORT

Robert Andrew Cheeseman, Hitchin, England, assignor to Xerox Corporation, Stamford, Conn.

Filed Oct. 14, 1975, Ser. No. 622,191
Claims priority, application United Kingdom, Nov. 20, 1974, 50316/74
Int. Cl.² G03G 15/10; B05C 1/08
U.S. Cl. 355—10 11 Claims

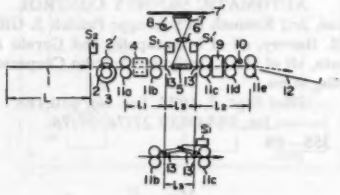


1. An electrostatographic apparatus comprising a liquid development assembly having support means therefor, said liquid development assembly having an applicator roll movable into and out of contact with the surface of an imaging member, said support means including a plurality of arms holding said liquid development assembly for movement in a plane substantially perpendicular to said imaging member surface at the area of contact with said applicator roll when they are in contact to compensate for variances therebetween and provide a uniform width of engagement along the length of contact.

4,017,175
APPARATUS FOR PREVENTING SUCCESSIVE JAMMING OF COPY SHEETS IN COPYING APPARATUS

Takaji Washio, Toyonaka, and Tatsuo Aizawa, Osaka, both of Japan, assignors to Mita Industrial Company, Ltd., Osaka, Japan

Continuation of Ser. No. 164,779, July 21, 1971, abandoned. This application Apr. 17, 1973, Ser. No. 351,977
Claims priority, application Japan, July 21, 1970, 45-63211
Int. Cl. G03g 15/22
U.S. Cl. 355—14 7 Claims



1. In an electrophotographic copying apparatus for producing images on copy sheets capable of being used in the apparatus, having a treatment zone including a charging means for charging a copy sheet, a light-exposing means having an optical system for projecting an image of an original to be copied on a charged copy sheet to form an electrostatic image on the copy sheet, a developing means for developing the exposed copy sheet thereby converting the electrostatic image to a visible image, a drying or fixing means for drying or fixing the image formed on the copy sheet, a forwarding mechanism for moving a copy sheet along a running path through the treatment zone from an initial nip to a discharge end, a copy sheet feeding mechanism for delivering single copy sheets to the initial nip of the forwarding mechanism, an original support for reciprocating the original laterally from a central position in synchronism with movement of the copy sheet and returning the original to the central position and a source of electricity, said copying apparatus comprising:

an activating means for controlling the copy sheet feeding mechanism;

first switch means having both a normally closed contact connecting said actuating means with a source of electricity and a normally open contact;

detecting means for detecting a copy sheet in the running path at least at one detecting point and controlling said first switch means to open said normally closed contact and close said normally open contact when a copy sheet is detected at said detecting point, said detecting point being positioned in the running path according to the following conditions:

$$l_1 < L$$

$$l_2 < L$$

where L is the minimum length of the copy sheets capable of being used in the apparatus, l_1 is the distance between the initial nip of the forwarding mechanism and said detecting point forwarding mechanism, and l_2 is the distance between said detecting point forwarding mechanism and the discharge end of the forwarding mechanism;

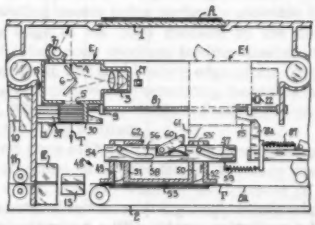
a second switch means closed only when the original support is stationary at the central position; and

alarm means connected with the source of electricity through said second switch means and said normally open contact of said first switch means, said alarm means being energized to signal occurrence of jamming of the copy sheet if the copy sheet is jammed in the running path and detected at said detecting point and closes said normally open contact of said first switch means when the original support returns to the central position and closes said second switch means.

4,017,176
MACHINE FOR COLOR REPROGRAPHY, INTENDED FOR PRODUCING COLOR SEPARATIONS OF AN ORIGINAL

René Béguin, Geneva, and Roland Monti, Cologny, both of Switzerland, assignors to Sublistatic Holding S.A., Glaris, Switzerland

Filed May 21, 1975, Ser. No. 579,725
Claims priority, application Switzerland, May 28, 1974, 7238/74
Int. Cl.² G03B 27/32, 27/52
U.S. Cl. 355—32 11 Claims



1. A color reprography machine for producing color separations of an original to be copied onto a photosensitive film, said machine comprising:

exposure means, mounted for movement from a storage position along a path positioned between an original and a photosensitive film, for exposing said original and reflecting an image therefrom to said film;

a filter magazine attached to said exposure means and containing a plurality of superposed parallelly mounted opti-

cal filters, said filters being individually movable between an operative position interposed in the path of said image and an inoperative position out of said path of said image;

stop means on said exposure means for moving all of said filters, upon movement of said exposure means to said storage position, to said respective inoperative positions;

means operable by movement of said exposure means for moving a selected one of said filters to the operative position thereof;

retention means on said magazine for retaining all said filters but said selected one filter in the respective inoperative positions;

a plurality, equal in number to the number of filters, of developing dispensers for developing on said film an image corresponding to a respective one of said filters;

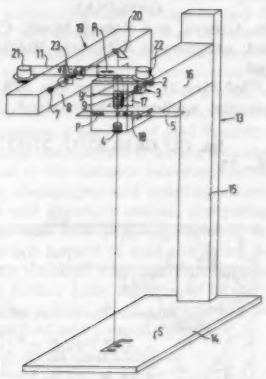
means operable by said retention means for moving the respective said developing dispenser corresponding to said selected filter to a dispensing position; and

perforating means, operable by movement of said exposure means, for punching at least one register cut-out in said film.

4,017,177
PHOTOSETTER

Siegfried Kühnle, Stuttgart, Germany, assignor to H. Berthold A.G., Germany

Filed June 2, 1975, Ser. No. 582,636
Int. Cl.² G03B 27/52, 27/70
U.S. Cl. 355—43 7 Claims

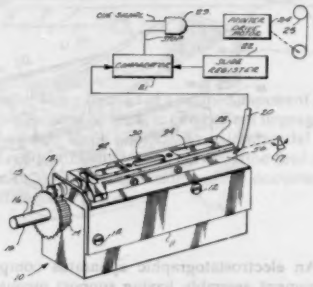


1. In a photosetter having a type carrier located in an object plane and a projection system with a projection objective by means of which type of said type carrier is projectable onto a setting plane spaced from said object plane; an auxiliary projection system having a film therein and located at a distance from said object plane by means of which an intermediate image of type on said film can be created at said object plane for projection onto said setting plane by said projection objective, said auxiliary projection system comprising an adjustably movable field lens for changing the size of said intermediate image at said object plane to correspond to the size of the type of said type carrier.

4,017,178
APPARATUS FOR DETECTING A MALFUNCTION IN A COLOR CONNECTING LIGHT VALVE OF A FILM PRINTER

Hans Chr. Wohlrab, North Hollywood, Calif., assignor to PSC Technology, Inc., Glendale, Calif.

Filed Mar. 14, 1975, Ser. No. 558,537
Int. Cl.² G03B 27/78
U.S. Cl. 355—38 15 Claims



1. In a light valve for a color correcting film printer having light vane means set by the expansion of a plurality of slides parallel to a first axis, the slides being individually actuatable parallel to a second axis transverse to the first axis in a path between a first position and a second position so the slides expand parallel to the first axis an amount depending upon the combination of slides actuated into the second position and being movable as a unit parallel to the first axis responsive to trim adjusting means, apparatus for detecting a malfunction comprising:

a carriage movable parallel to the first axis;

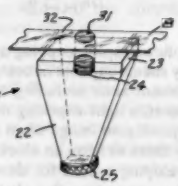
sensing means on the carriage intersecting the path of each slide to indicate whether the slide is in the first position or the second position; and

means for coupling the carriage to the trim adjusting means to move the carriage parallel to the first axis as the slides are moved parallel to the first axis as a unit to maintain the slides between the sensing means.

4,017,179
AUTOMATIC DENSITY CONTROL

John Poné, Jr.; Kenneth B. Schrupp; Patrick J. Gilligan; Ronald B. Harvey, all of Minneapolis, and Gerald A. Jensen, Wayzata, all of Minn., assignors to Pako Corporation, Minneapolis, Minn.

Filed Sept. 4, 1975, Ser. No. 610,188
Int. Cl.² G03B 27/74, 27/78
U.S. Cl. 355—68 9 Claims



1. An improvement for use with a photographic printer of the type which includes, a negative strip feed and positioning mechanism, a print paper feed and positioning mechanism disposed in spaced relation to the negative strip feed and positioning mechanism, a printing station including a print radiation source positioned to direct radiation through said

negatives and onto said print paper, a preview station located ahead of the printing station including negative positioning means and a preview radiation source positioned to direct radiation through a negative positioned at said preview station;

said improvement comprising:

a radiation directing member made from a material for conducting and directing radiation from one end to the other and being larger at one end than at the other with the enlarged end disposed in proximate spaced relation to said preview radiation source and the diminished end disposed remotely from said source, said member receiving and directing radiation transmitted through the negative positioned at the preview station,

subject sensing means mounted at the central portion of the enlarged end of said member to receive radiation transmitted through the central subject area of said negative from said preview radiation source,

background sensing means mounted at the diminished remote end of said member to receive radiation transmitted through the outer marginal area of said negative end directed through said member,

first electronic circuitry receiving the signals from said subject and background sensing means including means connected to said sensing means for producing a first and second signal responsive to the intensity of radiation respectively received by said subject and background sensing means and means for producing a ratio signal whose voltage is proportional to the ratio between the voltage of said first and second signals, and

second electronic circuitry receiving said ratio signal for producing a density output signal which may be used to control the exposure time of the negative in the photographic printer.

4,017,180

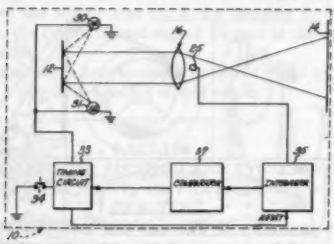
EXPOSURE CONTROL FOR COPYING MACHINE

Nai-Chyuan Yen, Waterford, Conn., and George Marinoff, Arlington Heights, Ill., assignors to Adddressograph Multigraph Corporation, Cleveland, Ohio

Filed Aug. 7, 1975, Ser. No. 602,581

Int. Cl.² G03B 27/74, 27/78

U.S. Cl. 355—68 **4 Claims**



1. Apparatus comprising means for projecting an image from an illuminated object plane to an image plane comprising illumination means for illuminating the object plane, a lens for receiving illumination reflected from said object plane and for transmitting said reflected illumination therethrough and onto said image plane, the path of said reflected illumination from said object plane to said image plane forming a light path, the portion of the light path between the lens and the object plane defining the object side of the lens and the portion of the light path between the lens and the image plane defining the image side of the lens, transducer means in said light path and on the image side of said lens for sensing the intensity of light traversing said light path and for producing an output signal whose intensity varies in accordance therewith, said transducer means being spaced from said lens a distance which is no more than 10% of the distance from the lens to the image plane and means coupled to said transducer means for controlling the illumination of said object plane by said illumination means in accordance with the intensity of said output signal.

4,017,181

COPY MEDIUM CARRIER

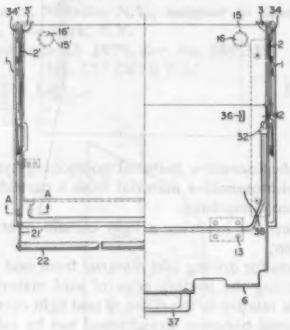
Shiro Komaba, and Yoshitomo Goshima, both of Kawasaki, Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 465,603, April 30, 1974, abandoned. This application Dec. 22, 1975, Ser. No. 643,194

Claims priority, application Japan, May 8, 1973, 48-51470

Int. Cl.² G03B 27/58; B65H 1/12, 1/28

U.S. Cl. 355—72 **8 Claims**



1. A copy medium carrier comprising:

first copy medium containing means having a front end pivotable about a portion thereof adjacent a rear end thereof;

second copy medium containing means having a front end pivotable substantially vertically;

means for separating the copy medium contained in said first and second copy medium containing means to feed the copy medium one by one;

means for normally urging said first copy medium containing means towards said separating means;

said separating means being vertically movable to be on a leading edge of the copy medium by the dead-weight thereof when copy medium feeding means acts on the copy medium, and said leading edge of the copy medium being urged towards the separating means by said urging means, when the copy medium feeding means does not act on the copy medium,

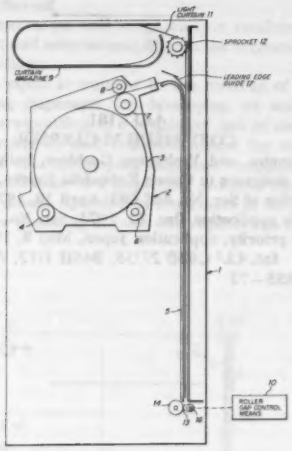
said second copy medium containing means being movable in the direction of the feeding of the copy medium between a first position wherein the topmost of the copy medium contained in said first copy medium containing means is engaged with said separating means by said urging means, and a second position wherein the topmost of the copy medium contained in said second copy medium containing means is engaged with said separating means by said urging means through said first copy medium containing means,

the copy medium within said first copy medium containing means and the copy medium within said second copy medium containing means being capable of being fed from the same position and through the same separating means.

4,017,182
PHOTOSENSITIVE MATERIAL POSITIONING SYSTEM

Daniel H. Robbins, Rochester, N.Y., assignor to Itek Corporation, Lexington, Mass.

Filed July 2, 1975, Ser. No. 592,491
Int. Cl.² G03B 27/58
U.S. Cl. 355—74 **1 Claim**



1. A photosensitive material positioning system for transporting photosensitive material from a cartridge to an exposure platen comprising:

a. means for lowering a light curtain over said exposure platen;

b. means for driving said material from said cartridge while directing the leading edge of said material at an acute angle relative to the plane of said light curtain so that said material becomes straightened out by said light curtain and travels along said curtain in contact therewith while being driven by said drive means, thereby to eliminate photosensitive material guide means which would be otherwise positioned adjacent said exposure platen in front of said platen;

c. means for raising said light curtain after final positioning of said material upon said platen to enable exposure thereof to a light image;

d. a pair of exit drive rollers for driving said material off of said exposure platen; and

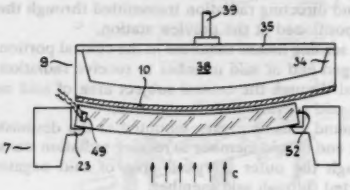
e. exit drive roller control means for selectively opening and closing the nip between said roller pair.

4,017,183
APPARATUS FOR THE PRODUCTION OF EXPOSED PRINTING PLATES

Werner Lenz; Josef Woellhaf, both of Ludwigshafen; Klaus Spreng, Weisenheim; Manfred Zuerger, Mannheim; Paul Hecke, Ludwigshafen; Gerhard Hoffmann, Speyer, and Milan Obradovic, Bruehl, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Germany

Filed Feb. 19, 1975, Ser. No. 550,913
Claims priority, application Germany, Feb. 23, 1974, 2408748
Int. Cl.² G03B 27/04
U.S. Cl. 355—85 **14 Claims**

1. An apparatus for the production of exposed printing plates comprising a mold having a first wall formed by the support of the printing plate to be produced and a second wall formed by a glass plate covered with an image-bearing transparency; means for introducing a predetermined amount of a fluid photopolymerizable material under pressure into the mold, said predetermined amount substantially corresponding to the volume of the resin layer of the exposed printing plate to be produced; first and second members which are movable relative to one another, said first member carrying the glass plate and said second member carrying the support, movement of the said two members toward each other serving to close said mold; at least one source of actinic radiation located in such a way that the layer of fluid photopolymerizable material can be exposed through the glass plate; and means provided on the said second member for so adjusting the support that the latter's surface is equidistant from the surface of the

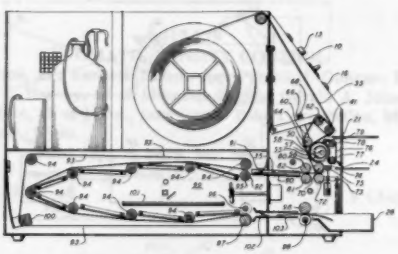


glass plate, and maintaining the distance between the said two surfaces during exposure of the layer of fluid photopolymerizable material, said introducing means introducing the fluid photopolymerizable material into the mold under pressure, which causes the glass plate to bend or dome outwardly of the mold, and said support-adjusting means consists for so bending or doming the support that its bent or domed surface is equidistant from the bent or domed surface of the glass plate, and for maintaining the distance between the said two surfaces during exposure of the fluid photopolymerizable material through the glass plate using said source of actinic radiation.

4,017,184
APPARATUS FOR COPYING TRANSLUCENT DOCUMENTS

Walter F. Allport, R.D. No. 3, Norwich, N.Y. 13815

Filed May 5, 1975, Ser. No. 574,441
Int. Cl.² G01B 9/02
U.S. Cl. 355—109 **1 Claim**



1. An apparatus for automatically copying the image of a translucent master sheet material onto a continuous web of sensitized copying material comprising:

a. a rotationally mounted transparent printing cylinder, adapted to continuously transport a translucent master sheet and a continuous web of sensitized copy material without intermittent stopping and starting; said transparent printing cylinder having a circumference approximately equal to one dimension of the translucent master sheet, and

b. means for feeding a translucent master sheet onto the transparent printing cylinder and automatically guiding the translucent master sheet away, after the desired number of multiple copies have been made, and

c. means for continuously exposing the image of the translu-

cent master sheet, on the transparent cylinder without intermittent stopping and starting between repetitive exposure upon a continuous web of sensitized copy material, until the desired number of multiple copies have been exposed, and

d. means for automatically advancing the exposed web of sensitized copy material at a constant speed and cutting it in synchronization with the locations of the exposed images of the translucent master sheet.

4,017,185

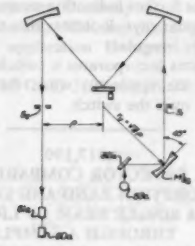
OPTICAL ARRANGEMENTS FOR COUPLING MONOCHROMATORS WITH EXTERNAL SYSTEMS

Vernon L. Chupp, Los Altos, Calif., assignor to Varian Associates, Palo Alto, Calif.

Division of Ser. No. 453,826, March 22, 1974, Pat. No. 3,936,191. This application May 12, 1975, Ser. No. 576,273

Int. Cl.² G01J *3/02*

U.S. Cl. 356—96 **8 Claims**



1. In combination with a monochromator comprising

a. means forming an entrance slits S_1 to receive a light beam from a source, and an exit slit S_2, said slits having curvature defining an Ebert circle,

b. dispersing means in the beam path between the slits S_1 and S_2, and

c. mirror means to reflect the beam for passage between slits S_1 and S_2 via the dispersing means,

d. the improvement comprising coupling optical means including a spherical mirror located in the beam path between the source and slit S_1 for imaging S_1 onto the source, the center of said mirror located at the center of said circle,

e. said spherical mirror having a radius of equal to 2ρ, where ρ equals the radius of said circle.

4,017,186

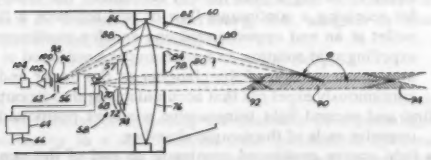
ELECTRO-OPTICAL METHOD AND SYSTEM FOR IN SITU MEASUREMENTS OF PARTICULATE MASS DENSITY

Frederick M. Shofner, and Gerhard Kreikebaum, both of Knoxville, Tenn., assignors to Environmental Systems Corporation, Knoxville, Tenn.

Filed Mar. 5, 1975, Ser. No. 555,355

Int. Cl.² G01N *21/00*

U.S. Cl. 356—103 **21 Claims**



1. A system for measuring in situ the mass per unit volume of particles suspended in a fluid medium, said system comprising a source of substantially monochromatic electromagnetic radiation having a wavelength of the order of magnitude of the mean diameter of each of a majority of the particles of interest, means for directing a beam of radiation from said source through a portion of said medium, photodetector means having a photosensitive medium for producing electronic detection signals systematically related to the intensity of electromagnetic radiation falling on said photosensitive medium, said photosensitive medium being located out of the path of said beam, optical means for directing upon said photosensitive medium electromagnetic radiation backscattered from a distally and proximally optically limited region of the portion of said fluid medium traversed by said beam, which limited region contains many of said particles, and indicator means responsive to said electronic detection signals for indicating the mass of said particles per unit volume of the fluid medium substantially independently of the size of particles of mean diameters of the order of magnitude of the wavelength of the radiation from said source.

4,017,187

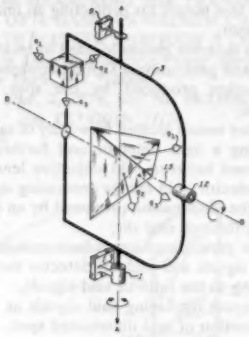
DOUBLE ROTATION INERTIAL MEASUREMENT APPARATUS

Bernard Schwartz, Melville, N.Y., assignor to Sperry Rand Corporation, New York, N.Y.

Filed June 23, 1975, Ser. No. 589,319

Int. Cl.² G01B *9/02*

U.S. Cl. 356—106 LR **12 Claims**



1. Inertial measurement apparatus comprising:

a plurality of equi-spaced ring laser means similarly disposed upon an inner spin member about a spin axis, thereof,

all of said ring laser means being disposed in individual planes at equal predetermined angles with respect to said spin axis,

spin motor means for rotating said inner spin member about said inner spin axis in a predetermined direction for eliminating mode-lock operation of each of said ring laser means within a predetermined operating range and whereby first components of bias and scale factor errors of the ring laser means outputs are cancelled,

drive frame means including first trunnion means for supporting said inner spin member therein,

reversible motor means for reversibly rotating said drive frame means about a second axis substantially perpendicular to said inner spin axis whereby second components of bias and scale factor errors of said ring laser means output are cancelled, and

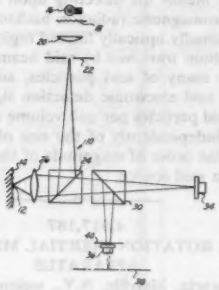
fixed frame means including second trunnion means for supporting said drive frame means for reversible rotation about said second axis,

said reversible motor means serving to drive said drive frame means with respect to said fixed frame means through successive integral numbers of revolutions after respective successive reversals thereof.

4,017,188
SURFACE PROFILE MEASURING DEVICE AND METHOD

Takeo Sawatari, Southfield, Mich., assignor to The Bendix Corporation, Southfield, Mich.

Filed Feb. 26, 1975, Ser. No. 553,332
Int. Cl.² G01B 11/30
U.S. Cl. 356—120 4 Claims

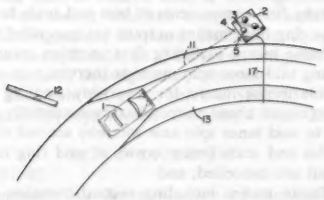


1. An optical surface profiling device for generating signals corresponding to variations in a surface comprising:
means for illuminating a spot scanned across said surface;
objective lens means for projecting an image of said illuminated spot;
large area detector means located to receive said projected image and generating a signal corresponding to the total illumination produced by the spot image projected thereon;
slit detector means located forwardly of said focal plane and including a light detector and further including a slit interposed between said objective lens means and said light detector, said means generating signals corresponding to the illumination produced by an image of said spot passing through said slit;
means for generating signals from said large area detector means signals and said slit detector means signals corresponding to the ratio of said signals,
display means displaying said signals as a function of the scan position of said illuminated spot;
whereby signals corresponding to the distance to said surface from a fixed reference are generated.

4,017,189
TESTING OF AUTOMOBILE HEADLIGHTS

Robert F. Bischoff, Jr., 30 Fairmount Ave., Morristown, N.J. 07960

Filed May 20, 1975, Ser. No. 579,237
Int. Cl.² G01S 9/02; G01J 1/00
U.S. Cl. 356—121 1 Claim

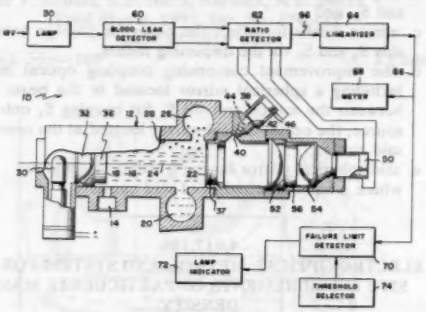


1. A surveying apparatus for the observation of headlights, where there is proper placement of the said apparatus for proper alignment of the apparatus to the headlights of moving vehicles and where the said apparatus is a receiving instrument which gives indications to the focuser of the headlights that the focusing of said headlights is either proper or improper, and where the said apparatus is so developed that a radar and a photocell activate the said apparatus, and where such activity shows through indicators whether the focusing of the headlights is regular or irregular, said apparatus comprising and functioning as follows:
1. an apparatus which possesses adjustable legs, an aiming device, and a leveling device so that said machine is able to be positioned for proper observation;
2. said apparatus is placed in an applicable location so that the apparatus is well able to observe the focusing of headlights;
3. a posting of notice signs prior to the reaching of the site of the apparatus, said posting is a notification that there is to be an inspection of vehicle headlights;
4. said apparatus containing a radar system and indicating means, which said radar system is able to transmit and receive so that the apparatus, through said indicating means, is able to show that a vehicle is present;
5. said apparatus further contains a photocell system which receives irregular headlight rays from a particular vehicle, and activates further indicating means which upon reception of irregular rays, indicates that the alignment of the light rays are irregular;
6. said apparatus incorporates a switch, which said switch deactivates the apparatus when the vehicle being observed runs over the switch.

4,017,190
BLOOD LEAK DETECTOR COMPARING INTENSITIES OF HIGH ABSORPTION BAND AND LOW ABSORPTION BAND OF A SINGLE BEAM OF LIGHT PASSING THROUGH A SAMPLE

Halbert Fischel, 5301 Newcastle, No. 16, Encino, Calif. 91316

Filed July 18, 1975, Ser. No. 597,243
Int. Cl.² G01J 3/46; 356/39;40;41;51;181;184;189;206;246;178
U.S. Cl. 356—178 17 Claims



1. A system for detecting the presence of hemoglobin in a solution comprising:
a radiant energy transmissivity cell including a sample chamber extending along an inclined optical axis between an upper end and an opposite lower end, the sample chamber having a fluid inlet at one end of the chamber for receiving a continuous flow of said solution, a fluid outlet at an end opposite said one end for continuously expelling said solution and a gas outlet positioned at an uppermost portion of the chamber at the upper end to continuously expel gas that accumulates at the gas outlet;
first and second light transmissive windows positioned at opposite ends of the sample chamber;
a light source positioned proximate an end of the sample chamber to emit radiant energy along the optical axis through the first and second windows and through the sample chamber;

first and second radiant energy detectors each positioned proximate an end of the sample chamber opposite the light source to receive radiant energy emitted by the light source after the energy has passed through the first and second windows and the sample chamber, and to generate an indication of the radiant energy incident thereon;

a bandpass optical filter disposed along a light path between a window at an end of the sample chamber proximate the first and second detectors and one of the detectors, the filter having a pass band centered at a wavelength at which hemoglobin constituents of blood are highly light absorbent; and

ratio detecting means responsive to the first and second radiant energy detectors for indicating the ratio of the indications of said detectors.

4,017,191

TWO-BEAM PHOTOMETER WITH ROTATABLE GRADED INTERFERENCE FILTER

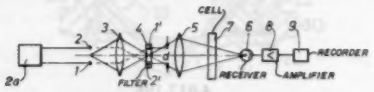
Konrad Bunge, Cologne, Germany, assignor to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed June 20, 1975, Ser. No. 588,750

Claims priority, application Germany, June 22, 1974, 2430011

Int. Cl.² G01J *3/50*; G01N *21/24*

U.S. Cl. 356—188 **6 Claims**



1. A two beam photometer comprising:

a. means for providing two light beams to provide a measuring beam and a comparison beam,

b. a first lens for receiving said beams and directing them in the direction of the optical axis of the lens,

c. a graded interference filter perpendicular to the optical axis and rotatable about the optical axis, disposed on the optical axis for receiving the beams from the first lens, for selecting a range of wavelengths for the measuring beam and another range of wavelengths for the comparison beam, the paths of the beams in the zone of the filter being narrowly limited and situated symmetrically on either side of the optical axis,

d. the path of the measuring beam and the comparison beam coinciding in space but following each other periodically in time,

e. a second lens for receiving the beams from the filter and directing them further along the optical axis,

f. a cell for holding a specimen to be investigated disposed in the path of beams from the second lens for at least partial transmission of the beams through the specimen,

g. a photoelectric means for receiving the beams passing through the specimen, and

h. means operatively connected to the photoelectric means for recording the output of the photoelectric means.

4,017,192

OPTICAL ANALYSIS OF BIOMEDICAL SPECIMENS

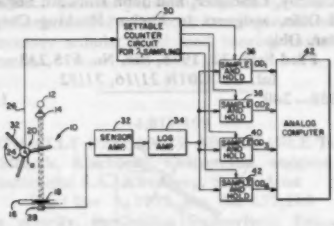
Robert D. Rosenthal, Gaithersburg, Md., assignor to Neotec Corporation, Silver Spring, Md.

Filed Feb. 6, 1975, Ser. No. 547,658

Int. Cl.² G01N *21/22*

U.S. Cl. 356—201 **13 Claims**

2. A method of detecting the presence of a pathological abnormality in a multicellular bulk biomedical specimen, comprising the steps of illuminating the multicellular bulk specimen sequentially with a plurality of difference light wavelengths, recording selected light absorption dependent values within the sample's light output spectrum, computing the value of a mathematical function of said selected absorption-dependent values, said mathematical function being selected to produce a computed value which correlates with the presence or absence of said pathological abnormality, and comparing the level of the computed value to a predetermined screening level.



4,017,193

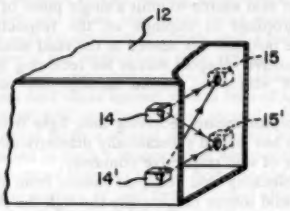
APPARATUS FOR MEASURING THE TRANSMITTANCE OR OPACITY OF A GASEOUS MEDIUM CARRYING PARTICULATE MATTER THROUGH A CONDUIT

Leo Loiterman, c/o American Electric Power Service Corp., 2 Broadway, New York, N.Y. 10004

Filed Mar. 2, 1976, Ser. No. 663,090

Int. Cl.² G01N *21/26*

U.S. Cl. 356—206 **19 Claims**



1. Apparatus for measuring the transmittance or opacity of a gaseous medium carrying particulate matter through a conduit which comprises

a. spaced first and second light sources and spaced first and second light sensors positioned on opposite walls of said conduit with equal shorter path lengths between first source and first sensor and between second source and second sensor and equal longer path lengths between first source and second sensor and between second source and first sensor,

b. means at each light source for producing and directing narrow collimated beams toward each light sensor,

c. means at each light sensor for producing a narrow reception beam angle,

d. means for exposing each sensor to collimated beams from said sources alternately during measuring periods and directing the collimated beams to the sensor at said reception beam angle thereof,

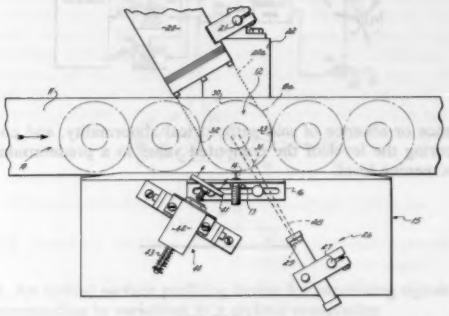
e. and computing means for utilizing the outputs of said sensors to produce the quotient of the products of the outputs corresponding to light transmitted over said longer paths and over said shorter paths and producing from the quotient an output corresponding to the transmittance or opacity over a predetermined distance of said gaseous medium carrying particulate matter.

4,017,194

APPARATUS AND METHOD FOR DIFFERENTIATING BETWEEN POLYMER COATED GLASS CONTAINERS AND UNCOATED CONTAINERS

Gary D. Conroy, Lancaster, and John D. Scott, Sugar Grove, both of Ohio, assignors to Anchor Hocking Corporation, Lancaster, Ohio

Filed Sept. 22, 1975, Ser. No. 615,235
Int. Cl.² G01N 21/16, 21/32
U.S. Cl. 356—240 13 Claims



1. Apparatus for inspecting glass containers to determine the presence of a polymer coating thereon, comprising,

means for moving the containers in single file along a path,

a stoboscopic light source triggerable to emit a pulse of light which will impinge on a container moving along said path,

position sensing means for sensing the moment when a container is in a read position while moving along said path,

said position sensing means being operatively connected to trigger said source to emit a single pulse of light which is synchronized to impinge on the respective container whose position was sensed at the read position,

light-sensitive receptor means for receiving light from said source which has passed through the respective container,

said receptor means receiving only light from said source which has passed substantially diametrically through the center of said respective container,

means blocking said receptor means from receiving light from said source tangentailly through the side wall of the respective container,

and continuously receptive circuit means responsive to the intensity of the single pulse of light received by said receptor means to produce an output signal indicative of whether the respective container has a polymer coating on it.

4,017,195

WRITING IMPLEMENT AND METHOD OF MANUFACTURING THE SAME

Rudi Jahraus, Keltern Ellmendingen, Germany, assignor to Moriz Hausch GmbH, Pforzheim, Germany

Filed Jan. 5, 1976, Ser. No. 646,875
Claims priority, application Germany, Jan. 25, 1975, 7502204[U]
Int. Cl.³ B43K 24/08
U.S. Cl. 401—104 1 Claim

1. A writing implement which comprises

a barrel formed with a slot,

a retaining clip carried by said barrel and disposed on the outside thereof,

a clip extension which is integral with said clip and extends in said barrel and has a laterally bent lower end portion extending into said slot, said extension being formed with a recessed ball seat, and

a pressure-operable mechanism which comprises a slider slidably mounted in said barrel and formed with a heart-

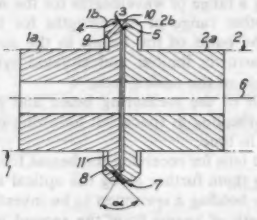
shaped groove, and a ball seated in said ball seat and protruding into said groove.

4,017,196

UNION FOR COUPLING MEMBERS

Pierre Jean-Louis Peàn; Josette Andrée Mauroux, both of 26600 Tain L'Hermitage, Beaumont-Monteux, and Bernard Rey, 26800 Portes-les-Valence, Etoile-sur-Rhone, all of France

Filed Feb. 3, 1976, Ser. No. 654,968
Claims priority, application France, Feb. 6, 1975, 75.04402
Int. Cl.² F16B 7/00
U.S. Cl. 403—2 9 Claims



1. A union for coupling first and second cylindrical members comprising:

a. a first radially directed annular flange on said first member;

b. a second radially directed annular flange on said second member;

c. said second flange having substantially the same diameter as said first flange;

d. a first truncated conical mating surface on said first flange;

e. a second truncated conical mating surface on said second flange;

f. at least three assembling holes in each of said first and second flanges;

g. said assembling holes passing through said first and second truncated conical mating surfaces;

h. the axes of said assembling holes making angles of at least 5° from the normals to said mating surfaces; and

i. means for connecting said first and second flanges together.

4,017,197

BALL JOINT WITH WEAR INDICATOR MEANS

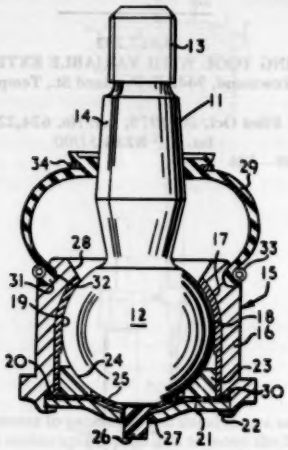
David John Rowland Farrant, Leamington Spa, England, assignor to Automotive Products Company Limited, England

Filed Dec. 16, 1975, Ser. No. 641,158

Claims priority, application United Kingdom, Dec. 23, 1974, 55459/74

Int. Cl.² F16C *11/06*

U.S. Cl. 403—27 6 Claims



1. A pivot joint comprising a pin having a head thereon; a socket comprising a housing receiving said head and defining a first aperture through which said pin projects; mating bearing surfaces on said head and said socket such that the pin is movable angularly with respect to the socket; a second aperture in said socket; a wear indicator received in said second aperture and having an inner end engageable with said head; and a flexible diaphragm extending between the indicator and the socket and fixedly secured around its periphery to a portion of said socket to seal the bearing surfaces against ingress of foreign matter through the second aperture.

4,017,198

PIVOTAL CONNECTION

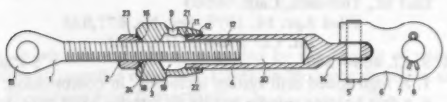
Henry Stanford Mason, Castlecrag, Australia, assignor to H. S. Mason Pty. Limited, Australia

Filed June 3, 1975, Ser. No. 583,482

Claims priority, application Australia, June 27, 1974, 7992/74

Int. Cl.² F16B *7/06*

U.S. Cl. 403—43 5 Claims



1. A turnbuckle including a first member adapted to be attached to eye means, a second member, means including a rod having disparate connecting means on one end thereof with its other end threaded into said second member, and means connecting said members for relative rotation about a common axis and for containing said members against relative axial movement wherein said connection means comprises a cylindrical portion on one member disposed within a bore on the other member, a plurality of discrete annular grooves in said cylindrical portion, a plurality of discrete annular grooves formed in the inner wall of said bore, said grooves in each member being disposed in closely spaced axial relationship along the respective members to provide an annular radially projecting ridge between each pair of grooves, the separate ridges on each member providing a plurality of annular substantially frustoconical axial load bearing surfaces engaging complementary annular axial load bearing surfaces of the other member.

4,017,199

ELASTICALLY-DEFORMED ADJUSTABLE T-JOINT

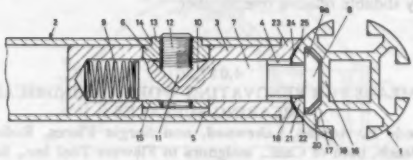
Marcel Strassle, Kirchberg, Switzerland, assignor to Syma Intercontinental S.A., Kirchberg, Switzerland

Filed Dec. 3, 1975, Ser. No. 637,210

Claims priority, application Switzerland, Dec. 9, 1974, 16319/74

Int. Cl.² B25G *3/00*; F16B *7/04*; F16L *41/00*

U.S. Cl. 403—264 7 Claims



1. A frame comprising: at least two sectional elements which are detachably interconnected and adapted to be pressed against each other, a first sectional element being of a double-walled construction and having webs, said webs connecting an inner section part of said first sectional element to an outer section part of said first sectional element, and said first sectional element further having longitudinal channels, longitudinal slots and vanes, said vanes being separated from each other by said longitudinal channels; and a bolt, which is anchored in one of the longitudinal slots, rotatably and longitudinally displaceably mounted in a second sectional element, said bolt presses said vanes against an end face of said second sectional element; said end face of said second sectional element and an outer surface of said first sectional element are differently shaped in such a manner that when said sectional elements are clamped together by said bolt, the end face bears against the outer surface of said first sectional element along lines of contact and rotation of the sectional elements relative to each other is prevented, further clamping causes said vanes to bear against said end face of said second sectional element by becoming elastically deformed.

4,017,200

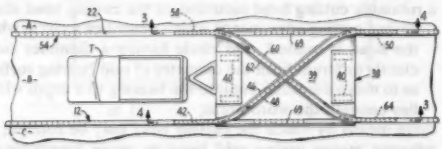
HIGHWAY LANE DIVIDER BARRIER AND APPARATUS FOR SHIFTING THE SAME

Frank W. Woods, Jr., P.O. Box 16434, San Francisco, Calif. 94116

Filed Apr. 28, 1976, Ser. No. 681,054

Int. Cl.² E01F *13/00*

U.S. Cl. 404—6 6 Claims



1. Apparatus for forming a removable barrier between two adjacent road lanes on a pavement surface comprising a plurality of substantially identical elongate generally U-shaped

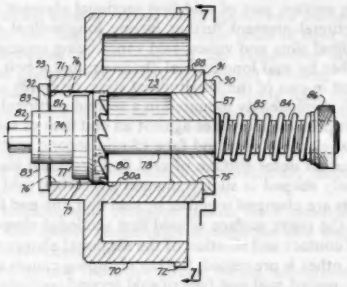
rigid members each having a central web and a pair of flanges integral with the web and extending normal to the web from opposite ends of the web, said U-shaped members being arranged in first and second sets, the first set being positioned with the webs in coplanar relationship and the respective flanges of adjacent members in surface-to-surface juxtaposition, said second set being identically arranged and having the flanges thereof extending intermediate the flanges of the first set so that the flanges bear against the reverse side of the U-shaped members in the other set and so that said planar surfaces of respective said sets are spaced from one another by an amount substantially equal to the sum of the thickness of the two webs plus the length of the flanges, said pavement defining a slot intermediate said road lanes, said slot being formed by two vertical surfaces below the pavement surface that are spaced from another by a distance corresponding to the thickness of said barrier so as to slidably receive the U-shaped members forming said barrier in said slot, and means at opposite longitudinal ends of said barrier for compressively supporting the ends of said barrier, said member being vertically slidable relative one another.

4,017,201

MEANS FOR RENOVATING WORN CYLINDRICAL BEARING SURFACES

Claude L. Adams, Lakewood, and Sergio Flores, Redondo Beach, both of Calif., assignors to Flowers Tool Inc., South Gate, Calif.

Filed Sept. 15, 1975, Ser. No. 613,335
Int. Cl.² B23B *41/12, 47/18*
U.S. Cl. 408—82 **1 Claim**



1. Tooling for removing worn areas from an original cylindrical bearing surface of a bearing mounted on a hollow bearing shaft having a central longitudinal axis, and permitting a sleeve having a cylindrical bearing surface of the same diameter as said original bearing surface to be fitted to said bearing, comprising:

a cutting head shaft;

means for supporting the cutting head shaft in a position concentric with said axis, said means comprising a portion of the cutting head shaft adapted to rotate and slide axially within the hollow of the bearing shaft;

a rotatable cutting head mounted on the cutting head shaft, having cutting edge means which describes a circle when the head is rotated, said circle having a diameter sufficiently different from the diameter of said bearing surface as to make a circular cut into the bearing to a depth which lies beneath the worn areas;

drive means by which the cutting head may be rotated;

advance means urging said head to move longitudinally relative to the bearing, so that rotation during said urging machines a cylindrical surface on said bearing of a diameter which is that of said circle; and

limit means attached to the cutting head to prevent further longitudinal movement of the head after a desired longitudinal length of said last-mentioned cylindrical surface has been achieved, said advance means comprising a compression spring positioned between a member attached to the cutting head shaft and a member to which the bearing is attached;

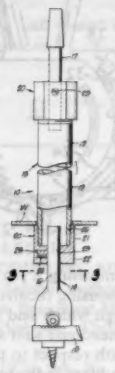
whereby the sleeve having a cylindrical bearing surface of the same diameter as the original bearing surface may be fitted to cover the machined surface of the bearing.

4,017,202

BORING TOOL WITH VARIABLE EXTENSION

Robert E. Townsend, 9442 E. Pentland St., Temple City, Calif. 91780

Filed Oct. 20, 1975, Ser. No. 624,224
Int. Cl.² B23B *51/00*
U.S. Cl. 408—226 **4 Claims**



1. A boring tool, comprising, in combination:

a. a rotatable cutter having an axially extending shank portion;

b. a coupling member having an axial bore at one end for the endwise reception of said shank portion;

c. means for releasably securing the received shank portion against rotation is said bore; and

d. an opposite end on said coupling member which is internally stepped and threaded for selective threaded connection with pipes of different diameter.

4,017,203

HIGH SPEED DRILL SYSTEM

William F. Marantette, and Ruth B. Marantette, both of 20624 Earl St., Torrance, Calif. 90503

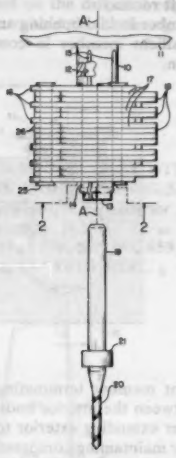
Filed Apr. 14, 1976, Ser. No. 677,035
Int. Cl.² B23B *31/10, 5/22*
U.S. Cl. 408—240 **5 Claims**

1. A high speed drill system including, in combination:

a. a drill holding spindle having an interior axial bore opening at one end and a plurality of exterior flats at equal circumferential spaced points on its exterior wall, said spindle including a similar plurality of exterior slots extending from equal circumferentially spaced points between said flats radially inwardly to intercept said bore and longitudinally along the spindle from said one end to points beyond the ends of said flats such that said flats can be biased radially inwardly to effectively decrease the cross sectional area of said bore adjacent to said one end; and

b. a plurality of eccentric weight means surrounding said spindle with their centers of mass at equally spaced radial

distances from the axis of the spindle and at equal circumferential spacing about said spindle, each weight means having straight internal segment means in opposed engaging relationship with at least one flat on the opposite side of the axis of said spindle from its center of mass, whereby high speed rotation of said spindle rotates said eccentric

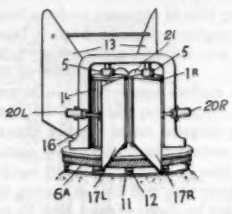


weight means to generate centrifugal forces and urge said segment means against said flats to move the flats radially inwardly so that when a drill shank is received in said one end of said bore, it is gripped by the inward movement of said flats to lock the drill shank against rotational and longitudinal movement relative to said spindle.

4,017,204
WIND MOTORS

Donald L. Sellman, 407 S. 3rd St., Lincoln, Kans. 67455

Division of Ser. No. 484,148, June 28, 1974. This application Dec. 1, 1975, Ser. No. 636,667
Int. Cl.² F03B 3/18
U.S. Cl. 415—2 9 Claims



1. A wind motor that is propelled by the impact of wind against an impeller rotor that travels in the same direction as the on-coming wind comprising:

a. a unit comprising a pair of impeller rotors which have vanes at the perimeter and which are mounted on a vertical axis, the pair of impeller rotors are substantially in series abreast, the vertical axis of each impeller rotor is journaled by a bearing at the top and bottom sides, the bottom bearings are supported directly by the base platform structure and the top bearings are supported by structure extending up on two sides from the base platform;

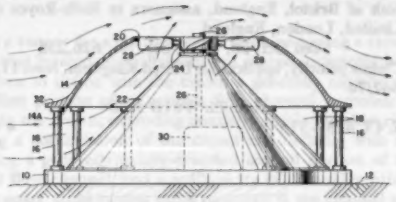
b. at right angle to the face of the rotary impellers are two vertical wind channel directing members, one vertical wind directing member on the left side and the other on the right side, preferably they are spaced widely apart at the outer edge and gradually slope upwardly toward each other at the inner side which is substantially in front of the vanes of these impeller rotors and almost close enough to touch these impeller rotor vanes;

c. and the angle of slope of these two wind directing channel members can be adjusted by mechanical means to control the speed of the impeller rotors and also to guard against violent destructive winds.

4,017,205
VERTICAL AXIS WINDMILL

Victor W. Bolie, 7504 American Heritage NE., Albuquerque, N. Mex. 87109

Filed Nov. 19, 1975, Ser. No. 633,387
Int. Cl.² F03D 7/00
U.S. Cl. 415—2 8 Claims



1. A windmill comprising:

a horizontal base;

a dome having a horizontal bottom spaced above said base and having a central circular orifice in a horizontal plane;

means to support said dome above said base providing an annular air inlet between the base and the dome bottom;

a conical baffle supported on said base below said dome, the conical axis thereof being coincidental with the vertical axis of said dome circular orifice;

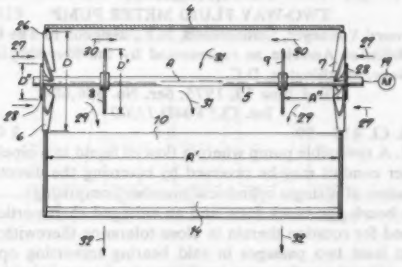
a vertical shaft supported coaxially in said conical baffle; and

an impeller affixed to said shaft and rotatably positioned in said plane of said dome circular orifice.

4,017,206
WINNOWING BLOWER FOR COMBINE HARVESTER-THRESHER

Klaus Döge, Dresden; Gerd Manig, Nassebohla; Wolfgang Hentsch, Grosspostwitz, and Johannes Mucke, Singwitz, all of Germany, assignors to VEB Kombinat Fortschritt Landmaschinen, Neustadt in Sachsen, Germany

Filed Sept. 3, 1975, Ser. No. 610,083
Int. Cl.² F01D 3/02; A01F 7/00
U.S. Cl. 415—102 5 Claims



1. A winnowing blower for discharging a stream of air over the sieve of a combine harvester-thresher, said blower comprising:

an axially elongated housing having axial ends each formed

with an inlet and a side formed with an outlet extending the full axial length of said housing;

a plenum passage extending radially from said housing at said outlet and directed at said sieve;

an axial-flow fan at each of said inlets;

means for rotating said fans and drawing air into said housing through said inlets; and

at least one transversely extending inperforate deflection plate in said housing between said fans, said plate being a disk mounted along the axis of said fans and having an axial spacing from one of said fans which is about one fifth to one-third of the axial distance between them, said disk having a diameter of about one-third to two-thirds the diameter of said one of said fans.

4,017,207
GAS TURBINE ENGINE

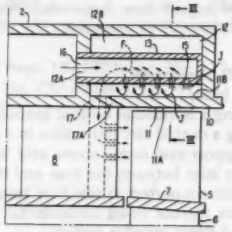
John Kenneth Alexander Bell, and John Rodney Dyson Fuller, both of Bristol, England, assignors to Rolls-Royce (1971) Limited, London, England

Filed Oct. 28, 1975, Ser. No. 626,238

Claims priority, application United Kingdom, Nov. 11, 1974, 48662/74

Int. Cl.² F01D *5/00*

U.S. Cl. 415—115 **4 Claims**



1. A gas turbine engine comprising an annular duct for combustion products, means defining an annular cooling air chamber surrounding the duct, a wall common to the chamber and the duct, a source of pressurized cooling air, an annular array of nozzles arranged in the chamber and connected to be supplied by said cooling air source, the nozzles being direced for axial spaced jets of air emanating therefrom to impinge on to and return from said wall, the nozzles being arranged in rows parallel to the axis of said chamber, an outlet at one axial end of the means defining the chamber for the returned air, and said axial rows of nozzles being circumferentially spaced apart to define, between next adjacent ones of said rows, axially extending spaces accomodating the flow of returning air to said outlet.

4,017,208
TWO-WAY FLUID METER PUMP

Bernard Vonnegut, Guilderland, N.Y., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed June 13, 1975, Ser. No. 586,684

Int. Cl.² F04D *11/00*

U.S. Cl. 415—90 **2 Claims**

1. A reversible pump wherein flow of liquid in a pipeline or other conduit may be reversed by reversing the direction of rotation of a single cylindrical member comprising:

a bearing in block form and an enlarged shaft portion disposed for rotation therein in close tolerance therewith;

at least two passages in said bearing traversing opposite sides thereof,

said passages in line and terminating at the apex of the interior surface of said bearing;

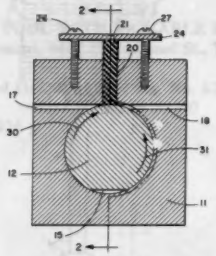
a liquid supply and/or discharge line connected to the outer ends of said passages;

at least one recess in the surface of said shaft positioned so as to be symmetrically disposed during rotation thereof with the interior ends of said passages,

said recess elliptical in shape and having a depth on the order of the diameter of said passages;

an opening in said bearing in register with and encompassing said shaft recess;

a resilient member in said opening and means for maintaining said resilient member in compression against said shaft portion,



said resilient member terminating at and spanning the space between the interior ends of said passages,

said member extending exterior to said bearing and said means for maintaining compression disposed outside of and adjustably secured to said bearing; and

means for rotating said shaft portion,

whereby rotation of said shaft portion in one direction pumps liquid in one direction through said passages and reverse rotation causes flow of liquid in the opposite direction through said passages via transport in said recess terminated by said resilient member.

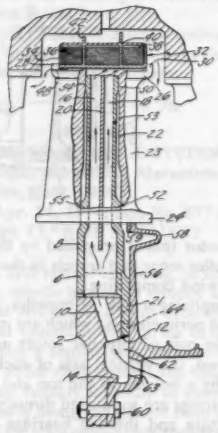
4,017,209
TURBINE ROTOR CONSTRUCTION

Robert R. Bodman, Riviera Beach, Fla., assignor to United Technologies Corporation, Hartford, Conn.

Filed Dec. 15, 1975, Ser. No. 640,808

Int. Cl.² F01D *5/18*

U.S. Cl. 416—97 R **12 Claims**



1. A turbine rotor construction including:

a disk having blade slots in the periphery;

blade positioning tubes having roots fitting in said slots and extending radially outward therefrom;

ceramic blades positioned on said tubes and radially slidable thereon, the outer end of the blade extending radially beyond the tube;

a filament wound ring surrounding said blades and engageable with the outer ends thereof, the ring being out of contact with the ends of the tubes; and

a spring ring mounted on the disk and engaging the inner ends of the blades to hold the blades against the ring.

4,017,210

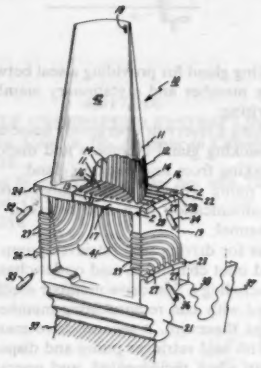
LIQUID-COOLED TURBINE BUCKET WITH INTEGRAL DISTRIBUTION AND METERING SYSTEM

Kenneth A. Darrow, Sprakers, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Feb. 19, 1976, Ser. No. 659,576

Int. Cl.² F01D *5/18*

U.S. Cl. 416—97 R **12 Claims**



1. Turbine bucket construction having a leading edge and a trailing edge comprising in combination:

integrally formed airfoil-shaped core, platform, shank and root portions;

a plurality of first coolant passages extending along the pressure and suction faces of said core portion;

a plurality of second coolant passages in said platform portion, each of said second coolant passages being connected at one end thereof to a separate one of said first coolant passages as a set;

skin material disposed over the upper surface of said platform portion and over said core portion;

a first pair of arcuate gutters as an integral part of said bucket construction with one of said gutters in said first pair projecting from the leading edge of said bucket and the other of said gutters in said first pair projecting from the trailing edge of said bucket, both of said gutters in said first pair being located radially inward of said core portion;

a second pair of arcuate gutters integral with said shank portion with one of said gutters in said second pair being disposed at each end of said shank portion, the centers of the radii of curvature of all gutters lying on a common axis; and

each of said gutters having at least one hole extending therethrough in the generally radial direction, each of said holes being in flow communication with a separate one of said sets of coolant passages

whereby each of said holes will meter the flow of liquid coolant to the set of coolant passages with which it is in flow communication and each of said gutters can be made to supply a different amount of liquid coolant to the holes extending therethrough.

4,017,211

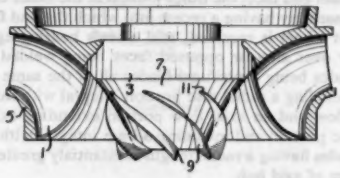
RUNNER FOR HYDRODYNAMIC MACHINES

Ludvig Rune Ingvar Alestig, and Göte Ivar Gustavsson, both of Kristinehamn, Sweden, assignors to Aktiebolaget Karlstads Mekaniska Werkstad, Karlstad, Sweden

Filed Sept. 17, 1975, Ser. No. 614,345

Int. Cl.² F01D *1/10*

U.S. Cl. 416—183 **4 Claims**



1. In a runner for a hydrodynamic machine having a crown, a skirt ring located coaxially with and spaced outwardly from the crown to define with the crown a generally radially oriented first portion of an annular flow channel, a crown tip joined to the crown, extending coaxially within the skirt ring, forming a continuation of the crown and defining with the skirt ring a generally axially-oriented second portion of the annular flow channel, and a multiplicity of circumferentially spaced-apart, fixed runner vanes mounted in the channel and extending between the crown and the skirt ring, the improvement comprising a multiplicity of fins attached to and extending generally radially from the crown tip and adapted to modify the direction of flow leaving the runner vanes to provide substantially axial flow from the runner, the fins being spaced apert circumferentially, and each fin being substantially triangular in shape, as viewed in plan and having dimensions radially of the annular flow channel at all locations thereon that are substantially less than the radial dimensions of the flow channel at such locations such that flow through the flow channel is not substantially obstructed, the apex portion of each fin being in proximity to the runner vanes and the base portion of each fin being remote from the vanes and substantially spaced radially from the axis of rotation of the runner, the apex end of the apex portion of each fin being aligned with the direction of flow through the channel as it leaves the vanes and each fin being curved to deflect the flow of water progressively to turn the flow of water leaving the vanes substantially to eliminate circumferential flow.

4,017,212

BLADED ROTOR

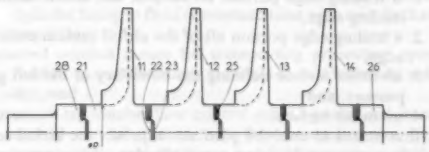
Jean Gordienne, and Georges Dousse, both of Le Creusot, France, assignors to Creusot-Loire, Paris, France

Filed Mar. 5, 1975, Ser. No. 555,613

Claims priority, application France, Mar. 14, 1974, 74.08719

Int. Cl.² F01D *5/06*

U.S. Cl. 416—198 A **2 Claims**



1. A bladed rotor for a centrifugal compressor comprising a plurality of coaxial wheels each comprising a hub and a blade having a foot formed integrally with the hub, said wheels being welded together at said hubs along weld planes perpendicular to the axis of the wheels by welds extending radially to the

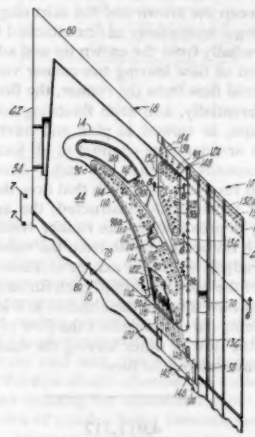
level of the feet of said blades, the blades of adjacent hubs being spaced from one another, each hub having an axial length equal to the spacing between adjacent blades, and journals welded to the hubs of the axially outermost ones of said wheels, one end face of the hub of each of said wheels having an axial projection cooperating with a recess provided in the other end face of an adjacent wheel receiving said projection, one journal at the end of said assembly of wheels having a projection cooperating with the recess of the adjacent wheel end face, the other journal at the other end of said wheel assembly having a recess into which the end face of the adjacent wheel is received, said wheels bearing against one another over annular opposed faces being welded together, said blades being centrifugal blades all of the same diameter, each including a radial disc portion integral with said hub for radial flow and an axial flow portion extending axially from said disc portion and including a base integral with said hub, said blades having a radial length substantialy greater than the diameter of said hub.

4,017,213

TURBOMACHINERY VANE OR BLADE WITH COOLED PLATFORMS

Hans Rainer Przirembel, Hebron, Conn., assignor to United Technologies Corporation, Hartford, Conn.

Filed Oct. 14, 1975, Ser. No. 622,322
Int. Cl.² F01D *5/18*
U.S. Cl. 416—97 A **19 Claims**



1. A turbomachinery vane or blade including:

A. an airfoil section having a leading edge, a trailing edge, a pressure side and a suction side and adapted to extend across a hot gas passage,

B. a platform attached to the airfoil section at one end thereof and extending substantially laterally with respect thereto and including:

1. a leading edge portion forward of the airfoil section leading edge,
2. a trailing edge portion aft of the airfoil section trailing edge,
3. an inner surface defining the boundary of the hot gas passage, and
4. an outer surface,

c. first means to cool the platform adjacent the airfoil section pressure side using a combination of impingement, convection and film cooling,

D. second means to cool the platform adjacent the airfoil section suction side using a combination of impingement and film cooling, and

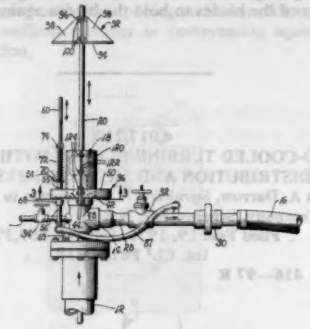
E. third means to cool the platform trailing edge portion utilizing convection cooling.

4,017,214

PACKING GLAND LEAK RETRIEVER DEVICE

Leonard G. Smith, 2325 Elton Ave., Bakersfield, Calif. 93306

Filed Nov. 25, 1974, Ser. No. 526,723
Int. Cl.² F04B *49/10*
U.S. Cl. 417—9 **9 Claims**



4. In a packing gland for providing a seal between a reciprocally movable member and a stationary member, a leak retriever comprising;

means defining a reservoir operatively associated with a first of said packing gland members and disposed to collect fluid breaking from said packing gland;

a retriever pump with an inlet channel interconnected in fluid communication with said reservoir means and an outlet channel;

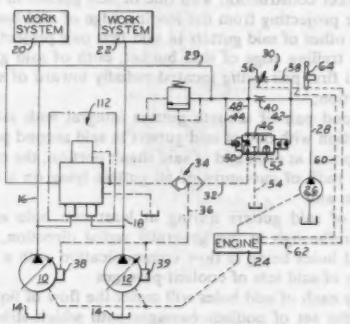
drive means for driving said retriever pump to pump fluid from said inlet channel to said outlet channel, said drive means including a first drive member mechanically interconnected with said reciprocating member for reciproal movement therewith, a second drive member interconnected with said retriever pump and disposed to operate said pump when reciprocated, and operating means including said first drive member disposed to engage and reciprocate said second drive member.

4,017,215

INFINITELY VARIABLE ORIFICE FOR PART THROTTLE CONTROL

Ralph G. Butler, Chicago, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Mar. 15, 1976, Ser. No. 666,722
Int. Cl.² F04B *49/00*; F16D *31/02*
U.S. Cl. 417—216 **4 Claims**



1. A hydraulic system including the combination of a plurality of variable displacement pumps driven by a single prime

mover, and a horsepower-controlling system for controlling the horsepower output of the variable displacement pumps, said system comprising:

a source of pilot pressure including a fixed displacement pump driven by said prime mover for controlling displacement of said pumps in relation to the speed output of said prime mover;

throttle control means for controllably selecting the speed of said prime mover;

underspeed control valve means responsive to a deviation from selected operating speeds of said prime mover for normally controlling the communication of said pilot control pressure with said pump displacement means to thereby vary the displacement of said pumps in proportion to load thereon; and,

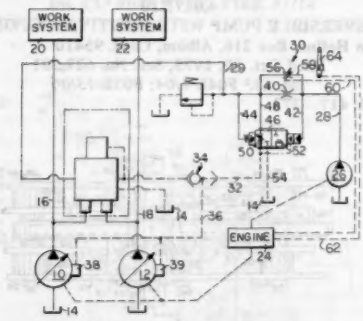
infinitely variable means movable with said throttle control means for adjusting the response of said underspeed valve to respond to a deviation from said operating speed.

4,017,216

VARIABLE UNDERSPEED SYSTEM LINKAGE

Huber A. Moore, Geneva, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Mar. 15, 1976, Ser. No. 666,723
Int. Cl.² F04B *49/00*; F16D *31/02*
U.S. Cl. 417—216 **3 Claims**



1. A hydraulic system comprising the combination of a plurality of variable displacement pumps driven by a single prime mover, and a horsepower-controlling system for controlling the horsepower output of the variable displacement pumps, including a source of pilot pressure including a fixed displacement pump driven by a prime mover for controlling displacement of said pumps in relation to the speed output of said prime mover, throttle control means for controllably selecting the speed of said prime mover, underspeed control valve means responsive to a deviation from selected operating speeds of said prime mover for normally controlling the communication of said pilot control pressure with said pump displacement means to thereby vary the displacement of said pumps in proportion to loads thereon, and infinitely variable means movable with said throttle control means for adjusting the response of said underspeed valve to respond to a deviation from said operating speed, the improvement comprising:

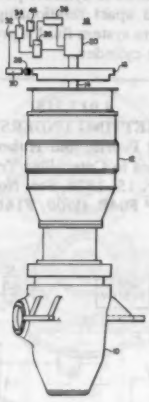
lost motion linkage means connecting said infinitely variable means to said throttle control means for movement of said infinitely variable means with said throttle control means only after said throttle control means has advanced a predetermined amount.

4,017,217

OVERSPEED PROTECTION SYSTEM

Robert P. Lamers, Franklin Township, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Feb. 26, 1976, Ser. No. 661,591
Int. Cl.² F04B *49/00*; F16D *31/02*; B60T *7/12*
U.S. Cl. 417—214 **9 Claims**



1. A protection system to prevent the failure of a flywheel of a fluid pump caused by an overspeed condition of said fluid pump, said flywheel being coupled to, and rotating with, a drive shaft of said fluid pump, said protection system comprising:

a positive displacement pump coupled to, and driven by, said fluid pump drive shaft, said positive displacement pump circulating a protection system fluid;

a discharge manifold serially connected to said positive displacement pump, said discharge manifold receiving said protection system fluid from said positive displacement pump, said discharge manifold having an orifice through which said protection system fluid exits from said discharge manifold, said discharge manifold having a fluid pressure therein dependent upon the speed of said positive displacement pump;

first conduit means for transporting protection system fluid from said positive displacement pump to said discharge manifold and from said discharge manifold orifice to said positive displacement pump;

braking means movably positioned adjacent to said flywheel, said braking means being capable of being in two positions with respect to said flywheel, one of said positions being in contact with said flywheel, the other of said positions being in spaced apart relationship with said flywheel, said braking means when in said position in contact with said flywheel providing braking of said flywheel;

a hydraulic cylinder fixedly coupled to said braking means and positioning said braking means in one of said two positions with respect to said flywheel, said hydraulic cylinder being in fluid communication with said discharge manifold;

second conduit means for transporting protection system fluid from said discharge manifold to said hydraulic cylinder; and

pressure-responsive flow control means positioned in said second conduit means, said flow control means being responsive to said discharge manifold pressure such that, when said discharge manifold pressure is above a first predetermined pressure, said flow control means permits flow of said protection system fluid from said dishcarge manifold to said hydraulic cylinder, and when said discharge manifold pressure is below said first predetermined pressure, said flow control means prevents flow of

said pressure system fluid from said discharge manifold to said hydraulic cylinder,

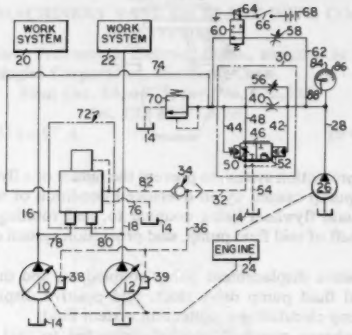
said hydraulic cylinder positioning said braking means in response to said flow of said pressure system fluid to said hydraulic cylinder, said hydraulic cylinder positioning said braking means in contact with said flywheel when said pressure system fluid is flowing to said hydraulic cylinder, said hydraulic cylinder positioning said braking means in spaced apart relationship with said flywheel when said pressure system fluid is prevented from flowing to said hydraulic cylinder.

4,017,218

DUAL-SPEED SETTING UNDERSPEED SYSTEM

Duane L. Burk, East Peoria, and Huber A. Moore, Geneva, both of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed Mar. 15, 1976, Ser. No. 666,724
Int. Cl.² F04B *49/00*; F16D *31/02*
U.S. Cl. 417—216 **5 Claims**



1. A hydraulic system comprising the combination of a horsepower-controlling system for controlling the horsepower output of a plurality of variable displacement pumps driven by a single prime mover, a source of pilot pressure including a fixed displacement pump driven by said prime mover for controlling displacement of said pumps in relation to the speed output of said prime mover, underspeed control valve means responsive to a deviation from either one of a predetermined normal operating speed of said prime mover and a second predetermined operating speed less than said normal speed controlling the communication of said pilot control pressure with said pump displacement means to thereby vary the displacement of said pumps in proportion to load thereon, and adjustable means for selectively adjusting said pilot control pressure so that the response of said underspeed valve is to a deviation from a selected one of said normal operating speed and said second operating speed, the improvement comprising pilot pressure-responsive indicator means for indicating said predetermined normal operating speed and said second predetermined operating speed.

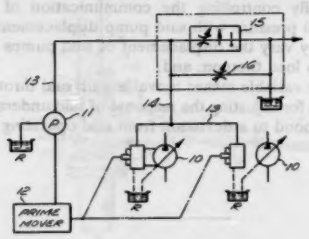
4,017,219

CONTROL SYSTEM FOR VARIABLE DISPLACEMENT PUMPS

Ellis H. Born, Columbus, and David L. Thurston, Ashley, both of Ohio, assignors to Abex Corporation, New York, N.Y.

Filed Dec. 22, 1975, Ser. No. 642,886
Int. Cl.² F04B *49/00*; F16D *31/02*
U.S. Cl. 417—216 **6 Claims**

1. In a control system which includes a prime mover, a plurality of independently adjustable variable displacement pumps driven thereby and an independent control for selectively varying the displacement of each pump, the improvement comprising a load sensing means connected to the prime mover, the load sensing means having an output signal proportional to the load on the prime mover, means connecting the output signal to each independent control, each independent control including input means for selectively setting the displacement of the pump, the input means includes means responsive to said output signal for proportionally changing the displacement of each pump when said output signal reaches a predetermined value which indicates the prime mover is overloaded, the input means further includes a servo valve which operates a fluid motor to set the displacement of the pump and manually operable means for setting the position of the servo



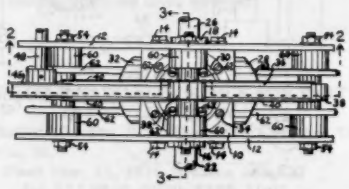
valve to thereby set the displacement of the pump, the servo valve further includes a movable valve member and movement of the valve member operates the servo valve between a first position of maximum pump displacement and a second position of minimum pump displacement, and the manually operable means includes movable setting means which operates the valve member and a ratio changing device which changes the ratio between the amount of movement of the setting means and the amount of corresponding movement of the valve member.

4,017,220

REVERSIBLE PUMP WITH POSITIVE VALVING

William Hotine, Box 216, Albion, Calif. 95410

Filed Oct. 30, 1975, Ser. No. 627,381
Int. Cl.² F04B *1/04*; F01B *13/06*
U.S. Cl. 417—273 **6 Claims**



1. A fluid pumping device comprising:

a plurality of mounting plates;

a ducting and support member substantially centrally secured within said mounting plates and containing an inlet duct, an outlet duct and a plurality of internal ducts;

a plurality of flat face portions formed on said member defining a plurality of cylinder heads, each of said cylinder heads having an inlet port and an outlet port, said inlet and outlet ports of each of said cylinder heads interconnecting with said internal ducts to permit the flow of fluid through said inlet and outlet ports of each of said cylinder heads in sequence from said inlet duct to said outlet duct;

a cylinder affixed to each of said cylinder heads, each of said cylinders enclosing said inlet and outlet ports of an associated cylinder head;

a reciprocating piston slidably positioned in each of said cylinders, each of said pistons having a top surface and a bottom surface;

a resilient sealing pad affixed to the bottom surface of each of said pistons;

a plurality of alignment guide rods secured to the top surface of each of said pistons, said alignment guide rods for each of said pistons holding cam follower means;

a plurality of rotatable bearings mounted within said mounting plates near the outer perimeters thereof;

a cam wheel surrounding said ducting and support member and operably positioned within said mounting plates for rotation about an axis, said cam wheel engaging said bearings and said cam follower means to sequentially cam actuate each of said pistons in equal time periods to sequentially receive fluid into each of said cylinders through said inlet port of each of said cylinder heads, to sequentially expel fluid from each of said cylinders through said outlet port of each of said cylinder heads, and to sequentially dwell closed to act as a valve to prevent passage of fluid through said inlet and outlet ports of each of said cylinder heads by compressing said resilient piston pad over said inlet and outlet ports; and

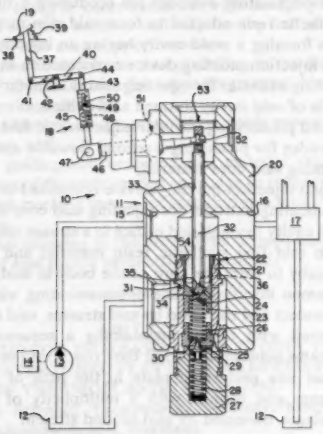
drive means connected to rotate said cam wheel about said axis, whereby fluid is pumped from said inlet duct to said outlet duct upon rotation of said cam wheel.

4,017,221

COMBINED UNLOADING AND RELIEF VALVE FOR PUMP UNLOADING CIRCUIT

Joseph E. Dezelan, Indian Head Park, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Feb. 27, 1976, Ser. No. 661,881
Int. Cl.² F04B *49/02*; F16K *31/14*
U.S. Cl. 417—305 **12 Claims**



1. A hydraulic fluid circuit comprising

a pressurized fluid source including a pump and a reservoir,

unloading valve means having an inlet communicating with said source for receiving pressurized fluid therefrom and for opening to reduce the pressure of said fluid below a first predetermined level,

actuating means for selectively opening said unloading valve means, and

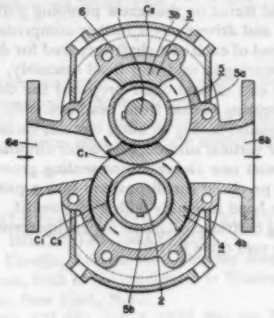
override means operatively connected to said actuating means for preventing said actuating means from opening said unloading valve means when the fluid pressure therein exceeds a second predetermined level which is higher than said first predetermined level.

4,017,222

PUMP FOR USE IN A PAINT APPLICATION APPARATUS

Yoshiaki Ueno; Yoshio Nishiumi, both of Tokyo, and Yukio Nagasaka, Kawagoe, all of Japan, assignors to Atom Chemical Paint Co., Ltd., Tokyo, Japan

Filed Sept. 24, 1975, Ser. No. 616,291
Claims priority, application Japan, Nov. 26, 1974, 49-135177
Int. Cl.² F04C *15/00, 1/14*
U.S. Cl. 418—46 **2 Claims**



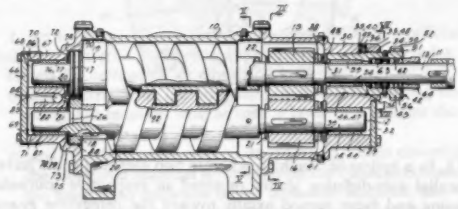
1. A pump for use in a paint application apparatus comprising a casing, a pair of shafts mounted to the casing and adapted to rotate in opposite directions to each other at a predetermined speed, a pair of rotors each of which has a boss portion and one or more protruded portions formed integrally with the rotor, said rotors being connected at their respective boss portions to end portions of the respective shafts, and a pair of grand boxes each having a cylinder section which is positioned between one of said shafts and the protruded portions through a heat resistive mechanical seal, wherein the casing, rotors and grand boxes are so disposed as to form clearances therebetween which are substantially equal to the diameter of the largest particles included in the paint.

4,017,223

AXIAL THRUST ADJUSTMENT FOR DUAL SCREW-TYPE PUMP

Elliott H. Blackwell, Warren, Mass., assignor to Houdaille Industries, Inc., Buffalo, N.Y.

Filed Mar. 24, 1975, Ser. No. 561,619
Int. Cl.² F01C *1/16, 21/00*; F04C *1/10*
U.S. Cl. 418—107 **9 Claims**



1. In a pump having a front head assembly, a rear head assembly, and dual screw pumping parts comprising,

a drive screw having a shaft,

a driven screw having a shaft,

means mounting said dual screw pumping parts for floating intermeshed rotation and providing an inlet and an outlet for pressurizing a pumping medium,

cylinder means at one end of the dual screw pumping parts,

piston means received in said cylinder means for axial movement relative to said screws and having pistons

engageable with corresponding said screws to adjust the relative longitudinal position of said screws,

pressure loading means for axially loading said pistons as a function of a pressure differential acting on said screws,

a timing cartridge at an opposite axial end of said screws, said timing cartridge being rotatably adjustable and having a movable element shiftable in an axial direction relative to said screw pumping parts,

means interfacng one of said screw pumping parts and said movable element to selectively adjust the position of said one screw pumping part to obtain a balance of the resultant axial thrust on the screw pumping parts,

said drive and driven screw further comprising,

said rear end of each said shaft prepared for disposition in a sleeve bearing in said rear head assembly,

said front end of said shaft prepared for disposition in a sleeve bearing in said front head assembly,

each said piston having an outer circular surface and a front and rear vertical surface, said outer circular surface having at least one circumferent sealing groove, said outer surface prepared for disposition into a piston portion in the rear head assembly with a by-pass fit,

said timing cartridge prepared for engagement with a timing gear on said drive screw.

4,017,224

GEAR MACHINE WITH CUTOUTS IN THE SHAFT JOURNALS

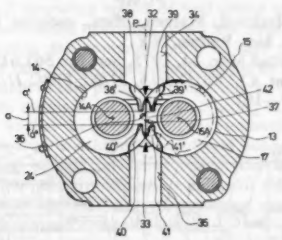
Claus Jöns, Munchingen, Germany, assignor to Robert Bosch G.m.b.H., Stuttgart, Germany

Filed Feb. 25, 1976, Ser. No. 661,162

Claims priority, application Germany, Mar. 11, 1975, 2510496

Int. Cl.² F01C *19/08*; F03C *3/00*; F04C *27/00*

U.S. Cl. 418—131 **7 Claims**



1. In a hydraulic machine wherein two meshing gears have parallel axis-defining shafts received in respective journals having end faces turned axially toward the respective gears and formed with cutouts opening in opposite directions in line with input and output passages formed in a housing carrying said journals and enclosing said gears, the improvement wherein said journals abut flatly at said cutouts along surfaces extending axially to immediately adjacent said gears and chordally to cylindrical continuations of the outer surfaces of said journals, each of said journals on each axial side of each gear being formed with a recess opening toward said inlet passage and a recess opening toward said outlet passage, each recess with the adjacent recess opening in the same direction constituting a one of said cutouts.

4,017,225

APPARATUS FOR THE PRODUCTION OF SYNTHETIC-RESIN BODIES HAVING CORE AND SKIN OF DIFFERENT DENSITY

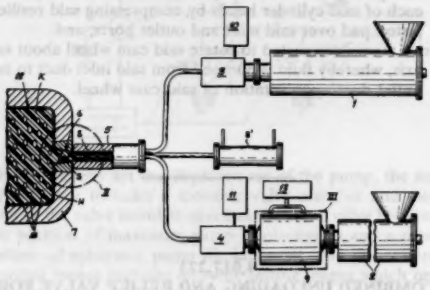
Robert Hanning, Campione d'Italia, Italy, assignor to Societa Internazionale per lo Sfruttamento di Brevetti S.A., Panaman, Panama

Division of Ser. No. 507,465, Sept. 19, 1974. This application Apr. 29, 1975, Ser. No. 572,713

Claims priority, application Switzerland, Sept. 19, 1973, 13479/73; Feb. 20, 1974, 2334/74; Apr. 29, 1974, 5812/74

Int. Cl.² B29D *27/00*

U.S. Cl. 425—4 R **3 Claims**



1. An apparatus for producing a synthetic resin body consisting of a homogeneous skin material and a pore-containing core material, said apparatus comprising:

a first plasticating extruder for producing a first flowable synthetic resin adapted to form said skin material;

means forming a mold cavity having an injection orifice;

a first injection-molding device connected to said first plasticating extruder for injecting said skin material along the walls of said cavity through said orifice;

a second plasticating extruder adjacent said first plasticating extruder for producing a second flowable synthetic resin forming said core material;

a second injection-molding device connected to said second plasticating extruder for injecting said core material into said cavity through said orifice in a stream simultaneously with said first synthetic resin material and surrounded thereby to form the core of the body in said cavity;

a common injection nozzle communicating with both said extruders and traversed by said streams, said nozzle being formed with means maintaining a separation of said streams substantially until they reach said orifice;

at least one perforated plate in the path of said second stream and formed with a multiplicity of porous-wall passages traversed by said second stream;

pressure means operatively associated with said passages for forcing a macroblowing agent through the porous walls of said passages to distribute said macroblowing agent in the synthetic resin of said second stream whereby said macroblowing agent expands within said mold cavity to produce gas bubbles therein;

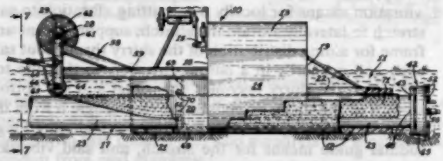
first and second control means connected respectively to said first and second injection-molding devices for controlling the rates of flow and pressures of the respective streams of synthetic resin traversing said orifice; and

further control means connected to said pressure means for regulating the flow of said macroblowing agent into said second stream independently of said first and second control means.

4,017,226
APPARATUS FOR LINING A CONTINUOUS CONCRETE PIPE

Joe E. Long, 2535 S. Main St., Santa Ana, Calif. 92707

Division of Ser. No. 164,395, July 20, 1971, Pat. No. 3,773,874. This application May 29, 1973, Ser. No. 365,034
Int. Cl.² B28B 21/12
U.S. Cl. 425—59 5 Claims



1. A cylindrical concrete pipe laying machine using a fluid pressure inflatable core comprising:

a frame having a semi-cylindrical bottom and vertically disposed sides slidably engaging a bottom of a pre-dug trench to receive a pipe,

a pair of laterally disposed vertical baffles one fixed to the front end and one fixed to the rear end of said frame,

an elongated horizontally disposed arcuate core support member fixed in spaced position from the inside surface of the bottom and sides of said frame and extending through an opening in said front baffle and rearwardly of said front baffle toward said rear baffle so as to define a space between the bottom of said trench and the underside of said core support member for troweling the lower half of the bore of the pipe to be formed,

a hopper fixed to said frame above said core support member, said hopper adapted to receive plastic cementitious material,

a top troweling member fixed to said rear baffle and extending rearwardly of said hopper,

said hopper being in communication with the space below said core support member and with the top half of a core carried on said core support member,

means secured to said frame and extending in the direction of movement of said machine for supporting a rotatable roll of flexible impervious material,

a roll of flexible impervious material rotatably supported on said frame, and

means for guiding and wrapping said material around at least a part of the core carried on said core support member as said machine moves forward during a pipe forming operation,

said material adhering to the bore of the formed pipe upon setting of said plastic cementitious material.

4,017,227
APPARATUS FOR INCREASING THE PRODUCTION OUTPUT OF STRETCHED FLAT FILM WEBS COMPOSED OF THERMOPLASTIC MATERIAL

Willi Johann Schmidt, Taunusstein, Germany, assignor to Hoechst Aktiengesellschaft, Germany

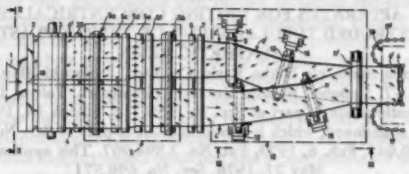
Division of Ser. No. 590,501, June 26, 1975. This application Dec. 5, 1975, Ser. No. 637,928
Claims priority, application Germany, June 29, 1974, 2431385
Int. Cl.² B29D 7/24
U.S. Cl. 425—66 6 Claims

1. In an apparatus for increasing the production of stretched flat film webs of thermoplastic material including an extruder, a flat slot die connected to said extruder, a cooling roller, and a transverse stretching frame,

the improvement comprising a slot die wider than the die normally employed for the production of a preliminary film which usually corresponds to the width of the transverse stretching frame,

an extruder having an output corresponding to the width of said wider die,

dividing means at said slot die for dividing a melt issuing therefrom into at least two longitudinal webs,



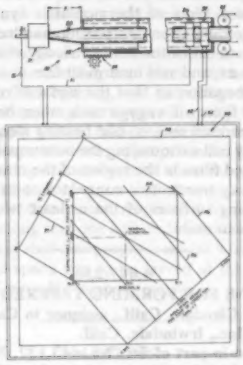
means for superposing said webs in register prior to entry into said transverse stretching frame,

and means for separating the superposed films in non-laminated condition after transverse stretching.

4,017,228
APPARATUS FOR MONITORING CELLULAR DIELECTRIC MATERIAL

Manuel Ramon Cereijo, Atlanta, and Timothy Stephen Dougherty, Norcross, both of Ga., assignors to Western Electric Company, Inc., New York, N.Y.

Division of Ser. No. 321,082, Jan. 4, 1973, Pat. No. 3,914,357. This application June 2, 1975, Ser. No. 583,002
Int. Cl.² B29F 3/10
U.S. Cl. 425—71 11 Claims



1. An apparatus for monitoring the application of a cellular dielectric material to an elongated material, which includes:

means for advancing an elongated material;

means upstream of the advancing means for covering the elongated material with at least a layer of a cellular dielectric material;

means effective subsequent to the covering means covering the elongated material for measuring the capacitance and the associated thickness of the dielectric material; and

means responsive to the measuring means measuring the capacitance and associated thickness of the dielectric material for generating electical signals related to the measured capacitance and associated thickness of the dielectric material; and

means responsive to the generation of the electrical signals for displaying the signals while relating the displayed signals to the weight of dielectric material per unit length of the elongated material and the percent of voids in the cellular dielectric material to control the weight of dielectric material per unit length of the elongated material and

engageable with corresponding said screws to adjust the relative longitudinal position of said screws,

pressure loading means for axially loading said pistons as a function of a pressure differential acting on said screws,

a timing cartridge at an opposite axial end of said screws, said timing cartridge being rotatably adjustable and having a movable element shiftable in an axial direction relative to said screw pumping parts,

means interfacng one of said screw pumping parts and said movable element to selectively adjust the position of said one screw pumping part to obtain a balance of the resultant axial thrust on the screw pumping parts,

said drive and driven screw further comprising,

said rear end of each said shaft prepared for disposition in a sleeve bearing in said rear head assembly,

said front end of said shaft prepared for disposition in a sleeve bearing in said front head assembly,

each said piston having an outer circular surface and a front and rear vertical surface, said outer circular surface having at least one circumferent sealing groove, said outer surface prepared for disposition into a piston portion in the rear head assembly with a by-pass fit,

said timing cartridge prepared for engagement with a timing gear on said drive screw.

4,017,224

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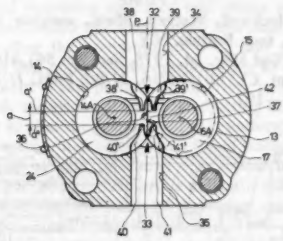
Int. Cl.² F01C *19/08*; F03C *3/00*; F04C *27/00*

U.S. Cl. 418—131 **7 Claims**



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4,017,225

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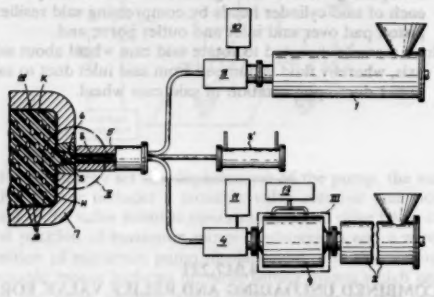
Robert Hanning, Campione d'Italia, Italy, assignor to Societa Internazionale per lo Sfruttamento di Brevetti S.A., Panaman, Panama

Division of Ser. No. 507,465, Sept. 19, 1974. This application Apr. 29, 1975, Ser. No. 572,713

Claims priority, application Switzerland, Sept. 19, 1973, 13479/73; Feb. 20, 1974, 2334/74; Apr. 29, 1974, 5812/74

Int. Cl.² B29D *27/00*

U.S. Cl. 425—4 R **3 Claims**



1. An apparatus for producing a synthetic resin body consisting of a homogeneous skin material and a pore-containing core material, said apparatus comprising:

a first plasticating extruder for producing a first flowable synthetic resin adapted to form said skin material;

means forming a mold cavity having an injection orifice;

a first injection-molding device connected to said first plasticating extruder for injecting said skin material along the walls of said cavity through said orifice;

a second plasticating extruder adjacent said first plasticating extruder for producing a second flowable synthetic resin forming said core material;

a second injection-molding device connected to said second plasticating extruder for injecting said core material into said cavity through said orifice in a stream simultaneously with said first synthetic resin material and surrounded thereby to form the core of the body in said cavity;

a common injection nozzle communicating with both said extruders and traversed by said streams, said nozzle being formed with means maintaining a separation of said streams substantially until they reach said orifice;

at least one perforated plate in the path of said second stream and formed with a multiplicity of porous-wall passages traversed by said second stream;

pressure means operatively associated with said passages for forcing a macroblowing agent through the porous walls of said passages to distribute said macroblowing agent in the synthetic resin of said second stream whereby said macroblowing agent expands within said mold cavity to produce gas bubbles therein;

first and second control means connected respectively to said first and second injection-molding devices for controlling the rates of flow and pressures of the respective streams of synthetic resin traversing said orifice; and

further control means connected to said pressure means for regulating the flow of said macroblowing agent into said second stream independently of said first and second control means.

4,017,226
APPARATUS FOR LINING A CONTINUOUS CONCRETE PIPE

Joe E. Long, 2535 S. Main St., Santa Ana, Calif. 92707

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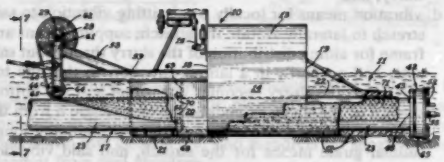
Int. Cl.² B28B 21/12
U.S. Cl. 425—59 5 Claims



1. A cylindrical concrete pipe laying machine using a fluid pressure inflatable core comprising:

a frame having a semi-cylindrical bottom and vertically disposed sides slidably engaging a bottom of a pre-dug trench to receive a pipe,

a pair of laterally disposed vertical baffles one fixed to the front end and one fixed to the rear end of said frame,

an elongated horizontally disposed arcuate core support member fixed in spaced position from the inside surface of the bottom and sides of said frame and extending through an opening in said front baffle and rearwardly of said front baffle toward said rear baffle so as to define a space between the bottom of said trench and the underside of said core support member for troweling the lower half of the bore of the pipe to be formed,

a hopper fixed to said frame above said core support member, said hopper adapted to receive plastic cementitious material,

a top troweling member fixed to said rear baffle and extending rearwardly of said hopper,

said hopper being in communication with the space below said core support member and with the top half of a core carried on said core support member,

means secured to said frame and extending in the direction of movement of said machine for supporting a rotatable roll of flexible impervious material,

a roll of flexible impervious material rotatably supported on said frame, and

means for guiding and wrapping said material around at least a part of the core carried on said core support member as said machine moves forward during a pipe forming operation,

said material adhering to the bore of the formed pipe upon setting of said plastic cementitious material.

4,017,227
APPARATUS FOR INCREASING THE PRODUCTION OUTPUT OF STRETCHED FLAT FILM WEBS COMPOSED OF THERMOPLASTIC MATERIAL

Willi Johann Schmidt, Taunusstein, Germany, assignor to Hoechst Aktiengesellschaft, Germany

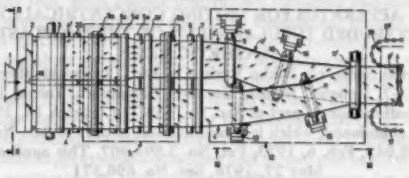
Division of Ser. No. 590,501, June 26, 1975. This application Dec. 5, 1975, Ser. No. 637,928
Claims priority, application Germany, June 29, 1974, 2431385
Int. Cl.² B29D 7/24
U.S. Cl. 425—66 6 Claims

1. In an apparatus for increasing the production of stretched flat film webs of thermoplastic material including an extruder, a flat slot die connected to said extruder, a cooling roller, and a transverse stretching frame,

the improvement comprising a slot die wider than the die normally employed for the production of a preliminary film which usually corresponds to the width of the transverse stretching frame,

an extruder having an output corresponding to the width of said wider die,

dividing means at said slot die for dividing a melt issuing therefrom into at least two longitudinal webs,



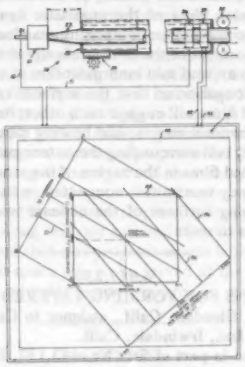
means for superposing said webs in register prior to entry into said transverse stretching frame,

and means for separating the superposed films in non-laminated condition after transverse stretching.

4,017,228
APPARATUS FOR MONITORING CELLULAR DIELECTRIC MATERIAL

Manuel Ramon Cereijo, Atlanta, and Timothy Stephen Dougherty, Norcross, both of Ga., assignors to Western Electric Company, Inc., New York, N.Y.

Division of Ser. No. 321,082, Jan. 4, 1973, Pat. No. 3,914,357. This application June 2, 1975, Ser. No. 583,002
Int. Cl.² B29F 3/10
U.S. Cl. 425—71 11 Claims



1. An apparatus for monitoring the application of a cellular dielectric material to an elongated material, which includes:

means for advancing an elongated material;

means upstream of the advancing means for covering the elongated material with at least a layer of a cellular dielectric material;

means effective subsequent to the covering means covering the elongated material for measuring the capacitance and the associated thickness of the dielectric material; and

means responsive to the measuring means measuring the capacitance and associated thickness of the dielectric material for generating electical signals related to the measured capacitance and associated thickness of the dielectric material; and

means responsive to the generation of the electrical signals for displaying the signals while relating the displayed signals to the weight of dielectric material per unit length of the elongated material and the percent of voids in the cellular dielectric material to control the weight of dielectric material per unit length of the elongated material and

the percent of voids in the cellular dielectric material to maintain the capacitance and associated thickness within a specified range of values.

4,017,229

APPARATUS FOR UNITING CONCENTRICALLY EXTRUDED TUBULAR FILMS OF THERMOPLASTIC SYNTHETIC RESIN

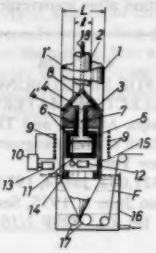
Michio Sudo, c/o Nikko Resin Co. Ltd., Fujikoshi Bldg. No. 23-7, 5 chome, Higashi Gotanda, Shinagawa, Tokyo, Japan

Continuation-in-part of Ser. No. 558,716, March 14, 1975, abandoned, which is a continuation-in-part of Ser. No. 330,043, Feb. 6, 1973, Pat. No. 3,894,907. This application May 27, 1976, Ser. No. 690,571

Claims priority, application Japan, June 26, 1972, 47-63273

Int. Cl.² B29C *17/07, 27/12*

U.S. Cl. 425—71 **7 Claims**



1. In an apparatus for uniting at least two concentrically extruded tubular films of thermoplastic synthetic resins to each other, a combination comprising mandrel means located within the innermost of the concentrically extruded films and constructed to expand said innermost film in a direction transverse to its elongation so that the surfaces of the concentrically extruded films will engage each other; heating means for heating said mandrel means, said heating means comprising a high-frequency coil surrounding the outermost of said concentrically extruded films in the region of the mandrel means and a high-frequency transmitter connected to said coil for causing the engaging surfaces of the at least two concentrically extruded films to unite.

4,017,230

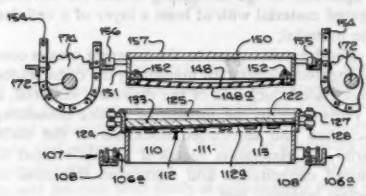
MEANS FOR FORMING TAPERED SLABS

Gus R. Jakel, Glendale, Calif., assignor to California Cement Shake Co., Inc., Irwindale, Calif.

Continuation-in-part of Ser. No. 443,137, Feb. 14, 1974, abandoned, which is a division of Ser. No. 303,225, Nov. 2, 1972, Pat. No. 3,870,777. This application July 25, 1975, Ser. No. 598,765

Int. Cl.² B28B *1/08, 3/12*

U.S. Cl. 425—84 **9 Claims**



1. Apparatus for making a cementitious product slab useful in construction, that comprises,

a. a continuous conveyor having a stretch movable in a longitudinal direction, there being fixed support structure supporting said conveyor,

b. support means carried by the conveyor stretch and having an upper surface which extends laterally at a shallow angle taper α form horizontal,

c. a frame carried on the conveyor stretch and bounding a zone directly above said support means, said zone adapted to receive a flowable aqueous cementitious slurry, said zone being upwardly open to accommodate downward application of pressure transmitted to said slurry, and

d. vibration means for locally transmitting vibration to said stretch to laterally vibrate the stretch, support means and frame for aiding distribution of the slurry throughout said zone and primarily in a lateral direction so that the top surface of the slurry becomes horizontal and the bottom surface of the slurry extends at the taper angle α from the slurry top surface, the support structure including longitudinal guide means for the stretch, and said vibration means operatively connected with said guide means to locally vibrate same laterally, thereby to vibrate the conveyor stretch and support means laterally, as aforesaid.

4,017,231

DEVICE ON APPARATUS FOR PRESSING POWDER OR GRANULES INTO CANDLES

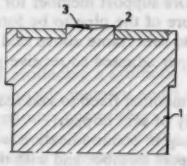
Hugo Karlsson, Kopmansgatan 17, S-820 60 Delsbo, Sweden

Filed Mar. 7, 1975, Ser. No. 556,342

Claims priority, application Sweden, Mar. 8, 1974, 7403091

Int. Cl.² B29D *31/00;* **B29C** *3/00*

U.S. Cl. 425—110 **3 Claims**



1. In an apparatus for pressing paraffin granules or paraffin powder into candles wherein a candle wick tube containing a candle wick is concentrically disposed within a candle-making tubular chamber, said tubular chamber also housing a piston which is slidably disposed therein and adapted to compress the paraffin granules or paraffin powder into a candle, the improvement which comprises providing a recess in the end face of the piston for receiving and centering the end of the wick tube in said tubular chamber to ensure that the wick is centered in the tubular chamber and subsequently in the candle from one end to the other end thereof.

4,017,232

APPARATUS FOR PRODUCING A CONTINUOUS FLEXIBLE REINFORCED TUBULAR CONDUIT

Homer N. Holden, Sylva; James P. Hunt, Clyde; Vernon D. Browning, Waynesville; Edward L. Hoglen, Candler, all of N.C., and Donald L. Kleykamp, Springboro, Ohio, assignors to Dayco Corporation, Dayton, Ohio

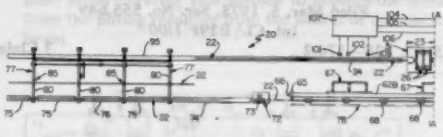
Division of Ser. No. 555,493, March 5, 1975, Pat. No. 3,929,957. This application Sept. 29, 1975, Ser. No. 617,780

Int. Cl.² B29F *3/10*

U.S. Cl. 425—112 **15 Claims**

1. Apparatus for producing a continuous flexible reinforced tubular conduit comprising, a plurality of elongated rigid mandrels operatively associated in aligned end-to-end relation, means moving said mandrels continuously through a fabrication area in a substantially rectilinear path, wire forming means in said area for forming a wire into a continuous non-rotating helical coil about said mandrels, an extruder head in said are downstream of said wire forming means oper-

able to receive a plastic material in a flowable condition, said moving means being the sole means moving said mandrels and moving said mandrels with said helical coil therearound through said extruder head at a speed correlated with the



speed of forming said helical coil, means within said head for forming a tube of said plastic material around said coil and mandrels to define said conduit, and means operatively associated with said conduit and said mandrels for separating said conduit from said mandrels.

4,017,233
DEVICE FOR PRODUCING CHIP BOARDS AND THE LIKE

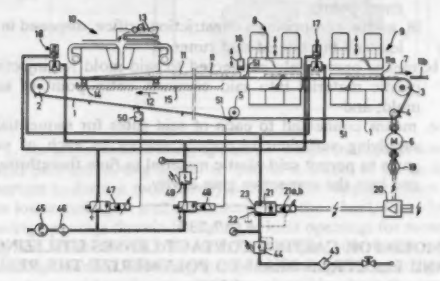
Heinz-Everhard Keusgen, Kaiserseech; Günter Seeger, and Reinhard Beyer, both of Springe, all of Germany, assignors to Bison-werke Bähre & Greten GmbH & Co. KG, Germany

Filed May 1, 1975, Ser. No. 573,530

Claims priority, application Germany, May 2, 1974, 2421284

Int. Cl.² B29C *3/06, 15/00*

U.S. Cl. 425—145 **9 Claims**



1. In a device for the treatment of the upper surface of a moving fleece used for the production of chip plates and the like, and/or of the upper surface of a conveyor belt provided for moving the fleece, with a fluid mist atomized with air, said treatment being accomplished before final hot pressing of the fleece, said apparatus including a motor for step-wise actuating said fleece conveyor belt and a timing relay for controlling the duration of operation of said motor, the improvement comprising a moving coil regulating device in the supply pipe supplying said fluid, a tacho-generator connected to said motor and an amplifier for amplifying the output voltage of said tacho-generator and controlling said moving coil regulating device.

4,017,234
MULTIPLE ROTARY CASTING MACHINE

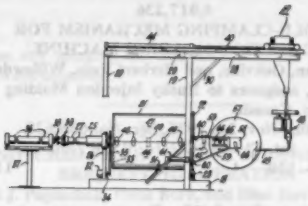
Theodore E. Andrews, Kutztown; John J. Weller, Emmaus, and Rudolph T. Benson, Jr., Walnutport, all of Pa., assignors to Armstrong Cork Company, Lancaster, Pa.

Continuation-in-part of Ser. No. 554,549, March 3, 1975, abandoned, which is a continuation of Ser. No. 383,072, July 27, 1973, abandoned. This application June 18, 1976, Ser. No. 697,685

Int. Cl.² B29D *27/04*

U.S. Cl. 425—145 **10 Claims**

1. A multiple rotary casting machine for casting foamed-plastic tubular articles, comprising a frame, a plurality of rotary casting units in spaced relation to each other and each having coaxially spaced inner and outer mold members supported for rotation with respect to said frame, thereby establishing an annular mold space between said members of each casting unit, each casting unit further including end-closure wall members closing the respective longitudinal ends of said mold spaces, corresponding ends of corresponding end-closure members having a filler opening in registry with the mold space served thereby and therefore offset from the rotary axis, foamable mold-material supply means having a single elongate tubular discharge element sized for accommodation at a selected one of said filler openings, two-component frame-based movable support means mounting said supply means for selective positioning of said tubular discharge element for axial insertion via the selected filler opening and into the annular mold space, and rotary drive means for the respective casting units; whereby, after discharhge of foamable material into the



mold space of a first casting unit and while foamed expansion and curing of such material are in process at said first casting unit, said supply means may be selectively repositioned within the mold space of a second casting unit and for service of the second casting unit to effect interlaced and concurrent casting procedures at both casting units; and actuating means operative during discharge-element insertion through a selected filler opening and controlling the volume of foamable material injected in each filler opening, said last-defined means including programmed means governing a selected program of operation of said supply means, said programmed means including first shot-size program means appropriate for the mold-space size of a first casting unit and second shot-size program means appropriate for the mold-space size of a second casting unit, and program-selection means responsive to position of said support means along said one axis and connected for selection of that one of said shot-size program means which is appropriate for the mold-space size to be served at the instantaneous position of said movable support means.

4,017,235
APPARATUS FOR AVOIDING AN EXCESS OF PRESSURE IN A CONTINUOUS PRESS

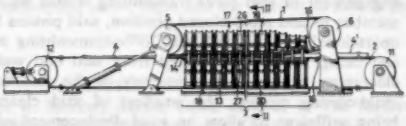
Karl-Heinz Ahrweiler, Krefeld, Germany, assignor to Edward Kusters, Krefeld-Forstwald, Germany

Filed Oct. 10, 1975, Ser. No. 621,381

Claims priority, application Germany, Oct. 30, 1974, 2451661

Int. Cl.² B29C *3/06*

U.S. Cl. 425—149 **5 Claims**



1. In a press having two press platens, each of which is supported on an external support construction wherein the force from one press platen is transmitted to its corresponding support construction through a pressure fluid within pressure

elements positioned between the platen and its corresponding support construction, means for maintaining proper positioning of the press platens during normal operation and for relieving excess pressures in the press comprising:

a. means rigidly coupling the support constructions associated with each of said two press platens;

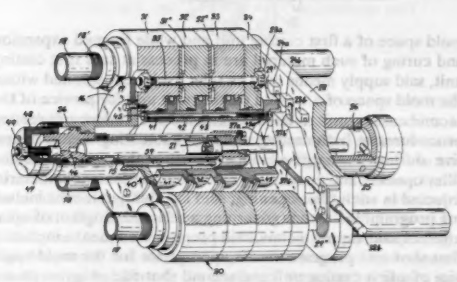
b. means coupled to the support construction associated with said pressure element and to one press platen for sensing deviations of said press platen from a pre-determined position and for regulating the pressure element so as to maintain said one press platen at said pre-determined position during a pressing operation; and

c. means for limiting the pressure of the pressure fluid at a pre-determined pressure while preventing an increase of spacing of the pressure platens over that necessary to prevent said pre-determined pressure from being exceeded.

4,017,236
MOLD-CLAMPING MECHANISM FOR INJECTION-MOLDING MACHINE

Dave Penkman, Oakville, and Herbert Rees, Willowdale, both of Canada, assignors to Husky Injection Molding Systems Inc., Bolton, Canada

Filed Nov. 26, 1975, Ser. No. 635,638
Int. Cl.² B29C *1/16;* B29F *1/00*
U.S. Cl. 425—150 **11 Claims**



1. In an injection-molding machine provided with a fixed platen, a movable platen and fluid-operated drive means for reciprocating said movable platen along an axis with reference to said fixed platen between a mold-open and a mold-closed position, the combination therewith of:

a stationary housing forming a plurality of cylinder chambers bounded by end walls generally transverse to said axis;

a like plurality of pistons respectively received in said chambers;

a thrust member rigid with said movable platen advancing past said pistons in a mold-closing stroke;

force-transmitting means mounted on said housing for engagement with said member in said mold-closed position;

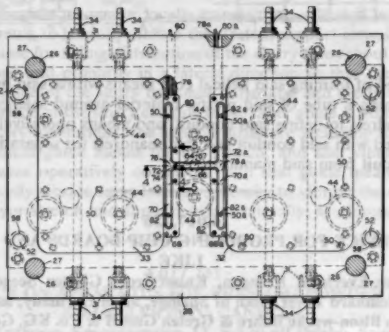
actuating means carried on said housing for moving said force-transmitting means into and out of engagement with said member; and

clamping means connected with said housing for admitting high-pressure fluid simultaneously to said chambers upon engagement of said force-transmitting means with said member in said mold-closed position, said pistons being operationally linked with said force-transmitting means and being normally separated from said end walls by clearances increasing progressively in the direction of mold-closing motion, the smallest of said clearances being sufficient to allow an axial displacement of said member with exertion of pressure upon a mold between said platens whereby said pistons successively come to rest against said end walls with separation from one another under the pressure of said fluid in the event of accidental overtravel.

4,017,237
INJECTION MOLD WITH ULTRA SONIC GATING MEANS

Geoffrey R. Webster, Coopersburg, Pa., assignor to Bethlehem Steel Corporation, Bethlehem, Pa.

Filed Mar. 5, 1975, Ser. No. 555,649
Int. Cl.² B29F *1/00*
U.S. Cl. 425—174.2 **3 Claims**



1. An apparatus for injection molding plastic material, comprising:

a. a mold comprising:

i. at least two cavities;

ii. a runner connecting each of said cavities to a common entry point;

iii. a gate, comprising a constriction orifice, disposed in at least all but one of said runners;

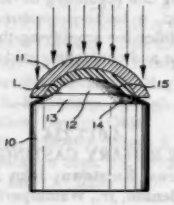
b. means operatively connected to said mold for injecting plastic material into said common entry point of said mold; and

c. means connected to each of said gates for sequentially supplying sufficient ultrasonic energy to each of said gates to permit said plastic material to flow therethrough and into the respective gate cavity.

4,017,238
MOLD FOR CASTING CONTACT LENSES UTILIZING AND ELECTRON BEAM TO POLYMERIZE THE RESIN LENS

Charles C. Robinson, Sturbridge, Mass., assignor to American Optical Corporation, Southbridge, Mass.

Filed Apr. 21, 1975, Ser. No. 570,042
The portion of the term of this patent subsequent to Oct. 28, 1992, has been disclaimed.
Int. Cl.² B29D *11/00;* B29C *3/00*
U.S. Cl. 425—174.6 **3 Claims**



1. A mold including a thin-walled cap member and a base member for casting contact lenses and the like by forming the lens within the mold from unpolymerized resin and subsequently polymerizing the resin while it is within the mold by the action of an electron beam directed against the thin-walled mold member and passing therethrough to act upon the resin, wherein said base member comprises:

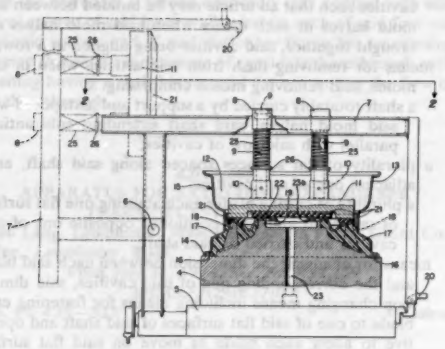
a stainless steel member having a surface shaped to conform with one surface of the lens being cast within the mold and being susceptible to pitting when acted on by an electron beam in the presence of a resin; and a layer of inert metal covering said surface to protect the surface from the pitting resulting from the action of the electron beam.

4,017,239

MOLDING APPARATUS

Ronald B. O'Connell, Waterville, and Albert H. Prueter, Jr., Perrysburg, both of Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed June 7, 1976, Ser. No. 693,658
Int. Cl.² B29C *1/00*, *27/30*
U.S. Cl. 425—175 **3 Claims**



1. An improved molding apparatus which includes a lower mold part containing a seat to permit a wheel to be locked thereon to form a mold cavity between the upper surface of the lower mold part and under surface of the wheel, said wheel having openings therein including at least openings for mounting the wheel on an axle and for charging the cavity with molding material, a sealing means for sealing the openings in the wheel, said sealing means being pivotable about the lower mold part by a pivot frame to bring the sealing means into a locked sealing relationship through an elastomeric gasket, said gasket in the locked sealing relationship being under uniform compression, said uniform compression being achieved by action of at least three springs located around the seal means and between the pivot frame.

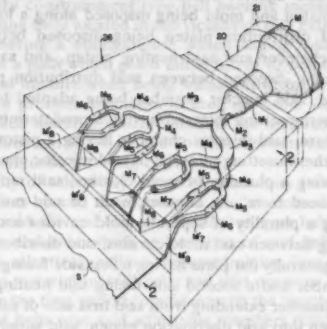
4,017,240

DIE FOR EXTRUDING SHEET MATERIAL

Robert F. Nelson, Canton, Ohio, assignor to Rubbermaid Incorporated, Wooster, Ohio

Filed Nov. 19, 1975, Ser. No. 633,435
Int. Cl.² B29F *3/06*
U.S. Cl. 425—192 R **8 Claims**

1. A die for extruding a sheet of elastomeric material having an entrance passageway for receiving a strand of extruded material, a symmetrical runner system in said die connected to said passgeway and comprising a plurality of laterally adjacent divided and sub-divided passageways substantially equal in length and cross section, two overlapping sets of laterally adjoining flattened passageways connected to alternate laterally adjacent passageways, said sets overlapping each other in staggered relation, said flattened passageways each gradually increasing progressively in lateral dimension and decreasing in vertical dimension while maintaining substantially the same cross-sectional area, and a laterally extending continuous



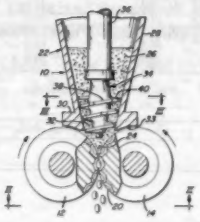
extrusion slot merging the exit ends of all of said flattened passageways together.

4,017,241

NOTCHED-FLIGHT FEEDER SCREWS FOR BRIQUETTING OPERATION

Michael J. Papinchak, Plum Boro, and Dino Ravasio, McKeesport, both of Pa., assignors to United States Steel Corporation, Pittsburgh, Pa.

Filed Nov. 7, 1975, Ser. No. 629,958
Int. Cl.² B29C *3/00*, *15/00*; B30B *3/00*
U.S. Cl. 425—237 **9 Claims**



1. In a briquetting press including a hopper containing particulate material to be briquetted, a pair of cooperating press rolls mounted for opposite rotation adjacent the discharge end of said hopper for pressing particulate material fed thereto into briquettes, and a screw feeder having helical flights rotatably mounted in said hopper for feeding said particulate material to said press rolls wherein the improvement comprises:

a. that screw flight adjacent said press rolls being substantially impervious to the retrograde movement of particulate material; and

b. all the remaining screw flights having through-openings defining a passage for the retrograde movement of particulate material, which passage extends between said aforementioned screw flight and the interior of said hopper.

4,017,242

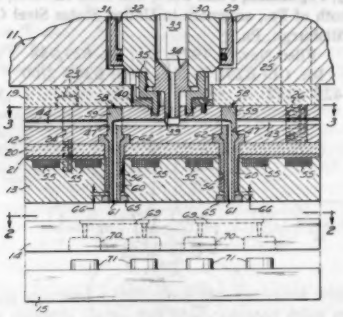
INJECTION MOLDING APPARATUS

James R. Mercer, Akron, Ohio, assignor to The McDowell-Wellman Engineering Company, Cleveland, Ohio

Filed Oct. 28, 1975, Ser. No. 626,303
Int. Cl.² B29F *1/00*
U.S. Cl. 425—243 **23 Claims**

1. In combination, a multiple nozzle thermosetting injection molding machine and a mold; said thermosetting injection

molding machine comprising an injector chamber, a distribution platen, a heating platen, and a plurality of distribution nozzles; said injector chamber and distribution platen and heating platen and mold being disposed along a longitudinal axis, said distribution platen being disposed between said injector chamber and said heating platen, and said heating platen being disposed between said distribution platen and said mold; said injector chamber being adapted to be filled with a thermosetting material having a predetermined curing temperature, said injector chamber having a piston for pressurizing thermosetting material in said injector chamber; said mold having a plurality of mold clusters, said mold clusters being spaced from one another, each of said mold clusters including a plurality of separate mold cavities and a runner extending between said mold cavities; said distribution platen being a generally flat plate having a first side facing said injector chamber and a second side facing said heating platen, a supply chamber extending from said first side of said distribution platen into said distribution platen, said supply chamber being adjacent said injector chamber and being constructed and arranged to receive thermosetting material from said injector chamber; said distribution platen further including a distribution chamber extending along a line through said distribution platen and intersecting said supply chamber to



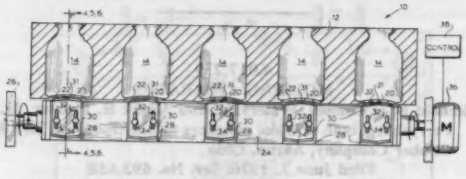
receive thermosetting material from said supply chamber, a nozzle bore on each side of said supply chamber, said nozzle bores each extending from said second side of said distribution platen through said distribution chamber, one of said distribution nozzles being in each of said nozzle bores for receiving thermosetting material from said distribution chamber, said distribution nozzles each extending from said distribution chamber toward said mold for carrying said thermosetting material from said distribution chamber to said mold; each of said distribution nozzles having a nozzle chamber constructed and arranged to carry thermosetting material from said distribution chamber to a single one of said mold clusters of said mold; said heating platen being a generally flat plate having heating means providing a source of heat; said nozzle chambers each extending through said heating platen from said distribution platen toward said mold; first temperature control means for maintaining the temperature of said distribution chamber below said predetermined curing temperature; second temperature control means for maintaining the temperature of at least a major portion of each of said nozzle chambers within said heating platen below said predetermined curing temperature; third temperature control means including said heating means for maintaining the temperature of said mold cavities at a temperature of at least said predetermined curing temperature.

4,017,243

ADJUSTABLE FLASH REMOVAL ASSEMBLY FOR MOLDED CONTAINERS

Michael L. Lindsay, Mount Dora, Fla., assignor to Doric Foods Corporation, Mount Dora, Fla.

Filed Sept. 22, 1975, Ser. No. 615,603
Int. Cl.² B28B 11/12
U.S. Cl. 425—292 **8 Claims**



1. Molding apparatus comprising:

two mold halves each having a plurality of corresponding cavities such that an article may be molded between said mold halves in each cavity when said mold halves are brought together, said cavities being aligned in a row;

means for removing flash from said articles when in said molds, said removing means comprising:

a shaft rotatably carried by a support and juxtaposed with said mold halves, said shaft extending substantially parallel with said row of cavities;

a plurality of flat surfaces spaced along said shaft, each adjacent one of said cavities;

a plurality of cutting blades each abutting one flat surface of said shaft and each positioned opposite one of said cavities and carried by said shaft;

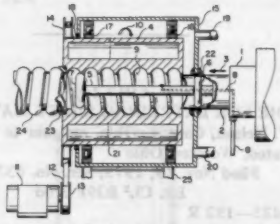
means for changing the dimension between each said blade and the corresponding one of said cavities, said dimension changing means including means for fastening each blade to one of said flat surfaces of said shaft and operative to allow each blade to move on said flat surface radially and independently with respect to the axis of said shaft and toward and away from the corresponding one of said cavities; and means for rotating said shaft whereby said blades remove any undesirable flash from all of said articles while positioned between said mold halves.

4,017,244

DEVICE FOR THE MOLDING OF CORRUGATED PIPE FROM EXTRUDED THERMOPLASTIC MATERIALS

Andrea Giuliano Vellani, 3 Hanson Way, Coram, N.Y. 11727

Filed Apr. 15, 1975, Ser. No. 568,241
Int. Cl.² B29D 23/04
U.S. Cl. 425—326 R **4 Claims**



1. A device for the molding of corrugated pipe from extruded thermoplastic materials comprising: a stationary frame having a first end mounted adjacent to the exit of an extruding machine and a second end downstream from said first end; a rotatable mold in said stationary frame having a first end adjacent to and aligned with said first end of said stationary frame, and a second end downstream of said first end through which a corrugated pipe exits; means mounting said mold for

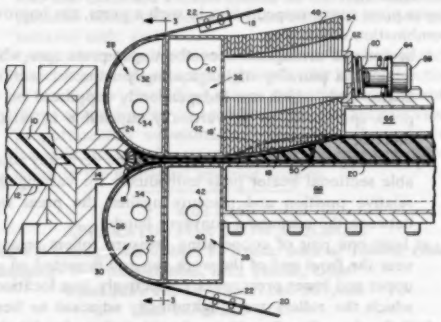
rotatable movement in said stationary frame; means for rotatably driving said mold about its longitudinal axis, said mold comprising a central passage forming an inner wall of said mold, said inner wall having a spiral groove formed along the length thereof, said stationary frame having means for cooling said mold and the extrudate, and means for supplying air pressure to the interior of the extrudate when passing through said central passage, said means for supplying air pressure comprising a source of pressurized air, and passage means connecting said source of pressurized air to the interior of said central passage, wherein said means for supplying pressurized air further comprises a mandrel mounted in said central passage having a first plug mounted at one end thereof, and a second plug mounted at the other end thereof, said first plug positioned within said first end of said stationary frame, and said second plug spaced downstream from said first plug and positioned within said central passage, said mandrel having a passageway in the center thereof forming part of said passage means of said means for supplying air pressure, whereby when pressurized air is directed to the interior of said central passage the extrudate is forced outwardly into contact with said spiral groove of said inner wall, wherein each of said first end and said second end of said stationary frame has an opening formed therein for the passage of extrudate therethrough each opening having a seal therearound for preventing the flow of air therethrough.

4,017,245

APPARATUS FOR EXTRUDING EXPANDABLE THERMOPLASTIC MATERIAL

Theo Lang, Leominster, Mass., assignor to Foster Grant Co. Inc., Leominster, Mass.

Filed July 26, 1974, Ser. No. 492,129
Int. Cl.² B29D *27/04*
U.S. Cl. 425—327 **3 Claims**



1. Apparatus for the continuous production of thermoplastic foam material having formed thereon a molecularly integral substantially non-cellular high density skin and a cellular internal body portion comprising:

an extruder including a chamber from which material including a mixture of molten thermoplastic polymer and a foaming agent is discharged;

an extrusion die located at the downstream end of said extruder through which said material is continuously discharged into a receiving area;

a pair of continuously traveling temperature controlled substantially thin metal belts following a path, a portion of which is positioned immediately adjacent said extrusion die so that said belt may immediately contact opposing upper and lower surfaces of said material as it is discharged in a foaming condition in which it expands to fill the receiving area, said belts serving as means to continuously withdraw said material from said extrusion die and to form a substantially non-cellular smooth molecularly integral skin on said extruded material;

temperature controlling means downstream of said extruder which maintain the surface temperature of said belts within a predetermined temperature range;

stationary constrainment type belt backing means for said traveling belts located in the vicinity of said extrusion die and having a configuration which causes said belts to follow a path which place initial forces of constrainment on said mixture while being withdrawn from said die;

a pair of pressure members located on either side of the extruded material which constrain the material in a lateral direction as it is moved downstream between the pair of continuous traveling belts; and

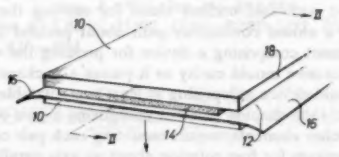
a plurality of selectively adjustable stationary belt backing members spaced downstream a predetermined distance from said die and said constrainment type belt backing means and over which at least one of said belts travels which selectively relieve the constraining forces placed on the material by said belts and said pressure members during the time period coincident with the length of travel of said belts over said adjustable members resulting in a predetermined cellular internal structure of said extruded material, each of said selectively adjustable stationary belt backing members including a substantially thin edge surface over which said belt travels and a body portion including at least one slot by which said member may be slideably positioned and clamped in a selected belt backing position.

4,017,246

CONVEYOR PLATE FOR WET SHEETS OR DRY SHEETS

William Falkinger, Farsta, and Per Anders Åsberg, Taby, both of Sweden, assignors to Defibrator Aktiebolag, Stockholm, Sweden

Filed Oct. 17, 1975, Ser. No. 623,533
Claims priority, application Sweden, Oct. 23, 1974, 7413343
Int. Cl.² B29C *3/00*
U.S. Cl. 425—338 **1 Claim**



1. A pressure plate assembly for hardboard presses comprising a pair of opposite horizontally disposed rectangular pressure plates defined by longitudinal and transverse edges, a thin metal sheet for supporting the mat forming material to be compressed into hardboard inserted between said pressure plates, said thin metal sheet having longitudinal edges and transverse edges conforming to the longitudinal edges and the transverse edges of said pressure plates, said longitudinal edges and said transverse edges of said sheet extending beyond the lateral limits thereof, the portion of said metal sheet extending beyond the longitudinal edge of said pressure plates being bent downward to impart substantial rigidity to said portion and to provide a drainage surface for the material to be compressed while the portion of said sheet between the lateral edges of said pressure plates is maintained in planar condition by said pressure plates, the portion of said metal sheet extending beyond the transverse plates forming horizontally extending projections, said projections having edge members of increased thickness relative to said metal sheet and extending at least coextensively with the transverse edges of said pressure plates.

4,017,247

DEVICE FOR THE FORMING OF A PACKING MATERIAL WEB IN A PACKAGING MACHINE

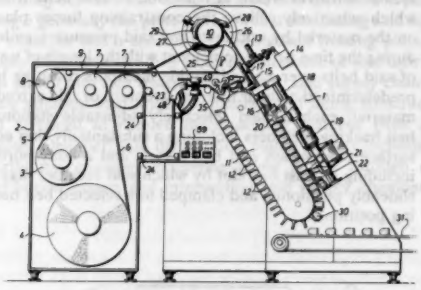
Franz Soukup, Malmo; Tore Ingvar Larsson, Loddekopinge, and Veine Bernt Borg, Kalmar, all of Sweden, assignors to Tetra Pak Developpement SA, Lausanne, Sweden

Filed Apr. 28, 1975, Ser. No. 572,091

Claims priority, application Sweden, June 28, 1974, 7408565

Int. Cl.² B65B 47/02

U.S. Cl. 425—360 8 Claims



1. In apparatus for forming a web of packaging material into a series of interconnected packages in which a plurality of U-shaped mould cavities are interconnected to form an endless chain having transverse walls separating each mould cavity and means adjacent said endless chain for feeding the web to the endless chain of mould cavities and means operatively associated with said endless chain for moving the endless chain in a closed continuous path about parallel axes, the improvement comprising a device for pressing the web into each successive mould cavity as it passes a package shaping station, said device comprising at least two rotatable shaping elements, each shaping element comprising a pair of spaced coaxial roller elements, means mounting each pair of coaxial roller elements for free rotation about an axis parallel to the parallel axes of said endless chain, and angularly equidistant from each other pair, means operatively associated with said shaping elements for rotating said shaping elements synchronously with the movement of the endless chain about a common fixed axis equidistant from the axes of each pair of coaxial roller elements and adjacent said endless chain so that each of said at least two shaping elements successively enter into and are withdrawn from successive mould cavities during movement of said endless chain and during synchronous rotation of said shaping elements about the common axis to press the web into successive mould cavities and a pressure device comprising an endless belt disposed between the spaced coaxial roller elements of each pair, one portion of said belt being located adjacent the transverse walls of the U-shaped mould cavities passing the package shaping station whereby the endless belt engages and presses the web of packaging material against the top of the transverse walls while passing the shaping station to prevent longitudinal slippage of the web after having been pressed into a preceeding mould cavity by one of said shaping elements.

4,017,248

CONTINUOUSLY OPERATING PANEL PRESS

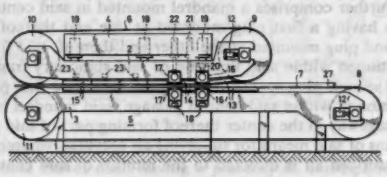
Gerhard Dieffenbacher, and Heinrich Pfeiffer, both of Eppingen, Germany, assignors to Maschinenfabrik J. Dieffenbacher & Co., Eppingen, Germany

Filed Jan. 31, 1975, Ser. No. 546,014

Claims priority, application Germany, Jan. 31, 1974, 2404523

Int. Cl.² B29C 3/06

U.S. Cl. 425—371 8 Claims



1. In a continuously operating panel press for the fabrication of pressed panels, such as chipboard panels, fiber panels, plywood panels, and the like, where a press frame carries an upper, vertically adjustable elongated press spar on an upper support, and a lower fixed elongated spar or press table on a lower support; and where each press spar is equipped with a horizontal conveyor comprising an endless conveyor band running from a reversing drum on the front end of the spar to a drive drum on the rear end of the spar so as to define a work gap between the two bands; and further where the continuously advancing conveyor bands on opposite sides of the work gap carry between them the press work which is to become a finished pressed panel, as pressure and heat are applied to the press work, via the moving bands, by heater pads that are arranged behind the bands and supported by the upper and lower press spars, respectively; in such a press, the improved combination comprising:

a heater pad arrangement on the upper press spar which features a plurality of longitudinally adjacent sectional heater pads which are independently supported on the press spar so as to be vertically adjustable in relation thereto;

hydraulic cylinder means connected to the vertically adjustable sectional heater pads individually for varying their relative position and pressure against the press work between the advancing conveyor bands;

at least one pair of cooperating pressure rollers arranged near the front end of the work gap and mounted on said upper and lower press spars, respectively, in a location in which the rollers are longitudinally adjacent to heater pads, the rollers bearing against the advancing bands in the sense of applying pressure against the press work, the pressure transmitting peripheries of the rollers being spaced a small amount closer than the adjacent heater pads which likewise bear against said bands, and at least the upper one of said rollers being vertically adjustable; and

hydraulic cylinder means for vertically adjusting said roller, thereby varying the pressure exerted by the roller pair against the press work between the advancing conveyor bands, and wherein

the hydraulic cylinder means associated with said adjustable heater pads and the hydraulic cylinder means associated with said roller pair are independently operable, so as to allow for a continuous variation of the ratio between the sliding friction which is created between the heater pads and the conveyor bands and the rolling friction which is created between the pressure rollers and the conveyor bands.

4,017,249
MELT SPINNING APPARATUS

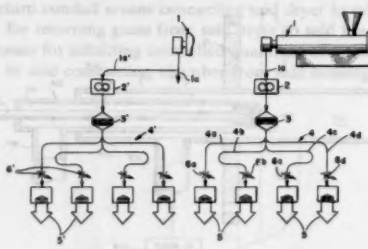
Erich Lenk, Remscheid, Germany, assignor to Barmag Barmer Maschinenfabrik Aktiengesellschaft, Wuppertal, Germany

Continuation of Ser. No. 401,535, Sept. 27, 1973, abandoned. This application June 13, 1975, Ser. No. 586,539

Claims priority, application Germany, Oct. 5, 1972, 2248757

Int. Cl.² B29C *23/00*

U.S. Cl. 425—382.2 **4 Claims**



1. In a melt spinning apparatus for the production of polymer filaments, the combination of:

a. a plurality of spinning nozzle units connected in parallel;

b. a central extruder with a capacity sufficient to feed a polymer melt to said plurality of spinning nozzle units;

c. a central metering pump for receiving melt through a feed conduit from said central extruder and directing the metered melt through a branched conduit system to each of said spinning nozzle units;

d. a single central filter in said feed conduit line after said metering pump and before branching of said feed line into said branched conduit system for the removal of fine particles which still remain in the initially extruded and metered melt; and

e. pressure regulating means located in each branched conduit preceding a spinning nozzle unit in the direction of melt flow, including means adjusting the pressure drops at these points in each branched conduit to a value proportionately substantially larger than the pressure losses in the spinning nozzle units or the pressure differences in the individual spinning nozzles.

4,017,250
APPARATUS FOR BLOW MOLDING

Long Fei Chang, and Robert F. Kontz, both of Toledo, Ohio, assignors to Owens-Illinois, Inc., Toledo, Ohio

Filed June 16, 1975, Ser. No. 587,023

Int. Cl.² B28B *7/20*

U.S. Cl. 425—387 B **6 Claims**

1. In a mold for blow molding a container having a side wall surmounted by a dispensing opening and having a generally concave bottom wall,

means defining a mold cavity conforming to the shape of the container with the exception of an opening aligned with the location of said bottom wall,

a plurality of nested sleeves surrounding a central rod axially aligned with said opening, said sleeves and said rod each having a free axial extremity insertable through said opening and each being telescopically movable,

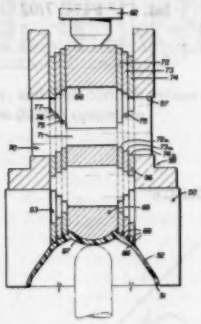
means for inflating a parison internally of said cavity, a portion of said inflated parison contacting the free axial extremities of said sleeves and said rod,

means for axially displacing said rod,

a radial actuating key fixed to said rod and displaceable with said rod into contact with each of said sleeves to displace the sleeves in timed sequence and to differing axial extents as the rod is displaced, the profile of the key determining the sequence and extent of displacement of each sleeve,

the rod being initially retracted at the time of parison inflation to position to the free extremities of the sleeves in an overall concave arcuate pattern, so that the parison is inflated against the extremities of the rod and the sleeves into a concave configuration, and

the rod being subsequently displaced towards the mold cavity to advance in sequence (1) the extremity of the rod and (2) the extremities of the sleeves against the inflated



concave parison portion, so that the ends of the rod and sleeves assume a convex pattern and the inflated parison portion is deflected to the desired, final, generally concave configuration, and

a stop key fixed relative to said rod and sleeves and of a profile complementary to that of said actuating key for limiting the extent of movement of said sleeves and said rod.

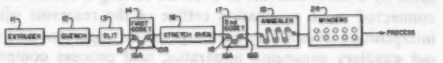
4,017,251
APPARATUS FOR PHYSICALLY CONDITIONING PLASTIC TAPE

Theodore Robert Coburn, Coventry, and James Edward Kilcoyne, East Providence, both of R.I., assignors to Marshall and Williams Company, Providence, R.I.

Division of Ser. No. 530,878, Dec. 9, 1974. This application June 4, 1976, Ser. No. 692,960

Int. Cl.² B29C *25/00, 17/00;* B29D *7/02, 7/24*

U.S. Cl. 425—404 **2 Claims**



1. An apparatus for physically conditioning plastic tape, comprising means for producing a moving web of thermoplastic material, in-line means for cutting said web into a plurality of parallel tapes, in-line means for tensioning said web, said means for tensioning having a set of rollers, a second in-line means for tensioning said web, said second means for tensioning having a set rollers rotating faster than said first set of rollers to provide increased linear speed, said first set of roller and said second set of rollers having a gap therebetween, a stretch oven located in said gap whereby said web is heat softened and stretched in said stretch oven, the improvement comprising an annealer in line following said second set of rollers and having a set of conductive steel heat transfer rollers and a set of conductive steel chill transfer rollers, the heat transfer rollers and the chill transfer rollers all being provided with means for rotating progressively slower than the preceding adjacent roller, to reduce the linear speed between rollers, said set of conductive steel heat transfer rollers reheating said tapes, and relaxing said tapes between the progressively slower rotating adjacent rollers thereby to control the shrinkage of the tapes due to said preheating and to stabilize the tapes against shrinkage.

4,017,252

METHOD FOR THE STORAGE OF A LIQUEFIED GAS IN THE PRESENCE OF AN ADSORBANT SUPPORT HAVING OPEN CELLS

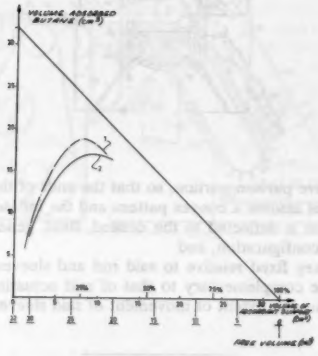
Georges Tallonneau, Avon, France, assignor to S.T. Dupont, Paris, France

Filed Oct. 15, 1974, Ser. No. 515,036

Claims priority, application France, Oct. 12, 1973, 73.36495

Int. Cl.² F17C 7/02

U.S. Cl. 431—12 3 Claims



1. A process of storing a liquefied gas for distribution exclusively in gaseous form into an atmosphere whose pressure is less than that of the storage chamber, the liquefied gas being combustible and being stored in the storage chamber constituted by a feed reservoir of a device having a burner directly connected to an evacuation orifice of the reservoir without interposition of auxiliary gas evaporation apparatus and without auxiliary expansion apparatus, said process comprising disposing in the storage chamber conjointly with the stored liquefied gas, quantity of a capillary adsorbant support having open cells, the minimum value of the actual volume of the support, constituted by the volume remaining after deduction of all interstitial spaces, going from (*a*) 2% of the volume of the storage chamber for a capillary support having open cells the mean volume of each, once in place, being equal to that of a sphere of a diameter of 40 microns with a mean thickness of the intercellular wall of about 4 microns to (*b*) 12% of the volume of the storage chamber for a capillary support having open cells in which the mean volume of each cell, once in place, being equal to that of a sphere of a diameter of 200 microns with a mean thickness of the intercellular wall of 30 microns, the amount of liquefied gas disposed in the chamber corresponding to the volume of the support such that all the liquefied gas is adsorbed by the support and only gaseous form of the liquefied gas is discharged upon opening of the evacuation orifice, the said minimum value of the actual volume of the support being of such magnitude to be sufficient to insure the distribution of the liquefied gas exclusively in gaseous form to the burner without auxiliary gas evaporation apparatus and auxiliary expansion apparatus.

4,017,253

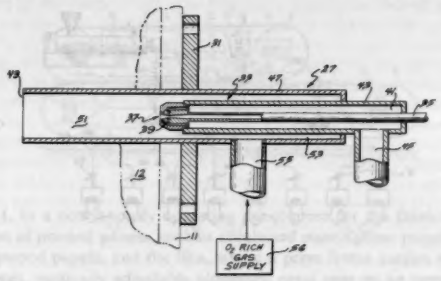
FLUIDIZED-BED CALCINER WITH COMBUSTION NOZZLE AND SHROUD

Joseph A. Wielang, Idaho Falls; William B. Palmer, Shelley, and William B. Kerr, Idaho Falls, all of Idaho, assignors to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed Sept. 16, 1975, Ser. No. 613,779

Int. Cl.² F27B 15/14; F23M 3/04

U.S. Cl. 432—58 4 Claims



1. In a fluidized-bed calciner for the processing of liquids containing solidifiable material to form dry solid particles, wherein said calciner comprises a vessel having walls defining an internal chamber, fluidizable solid particles within said chamber, means for passing an upward gas flow through said vessel to fluidize said solid particles, and nozzle means for injecting a fuel mixture for combustion into said internal chamber of said vessel, said nozzle means includes a first conduit for passing liquid fuel terminating with a venturi section towards said internal chamber of said vessel, said venturi section having a generally central constricted portion, a second conduit generally coaxially disposed about said first conduit to define an annulus for passing an oxygen-containing gas, said second conduit terminating around said venturi section and said venturi section including radial passageways at the constricted portion thereof whereby oxygen-containing gas from said second conduit is caused to flow into and atomize said liquid fuel, the improvement comprising an elongated, tubular shroud with one open end, disposed generally coaxially about said nozzle means, said nozzle means terminating at a location about flush with said vessel walls and said tubular shroud extending beyond the end of said nozzle means at said open end into said internal chamber to provide an antechamber within said shroud end portion between said open end and said nozzle means for the combustion of said fuel, said antechamber having a length-to-diameter ratio of about 2:1 to 5:1 extending into said internal chamber and supply means communicating with said shroud for supplying an oxygen-rich gas with a higher oxygen concentration than air to said antechamber.

4,017,254

RECIRCULATING FURNACE-DRYER COMBINATION

Allen Jacob Jones, Grants Pass, Oreg., assignor to S. J. Agnew, Tenino, Wash.

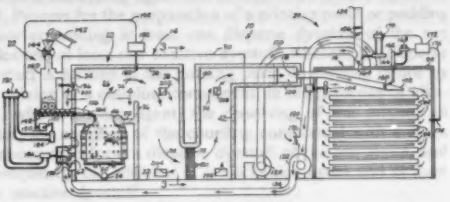
Filed Dec. 15, 1975, Ser. No. 640,963

Int. Cl.² F23J 15/00

U.S. Cl. 432—72 16 Claims

1. A recirculating furnace-dryer combination comprising a combustion chamber in which a greater than atmospheric

pressure may be maintained,
fuel feed means for feeding fuel to said combustion chamber,
housing means surrounding said combustion chamber in which a greater than atmospheric pressure may be maintained,
dryer means for receiving materials to be dried, said dryer constructed to maintain a greater than atmospheric pressure therein,
feed conduit means through which combustion gases may flow from said combustion chamber to said dryer,
return conduit means connecting said dryer to said housing for returning gases from said dryer to said housing,
means for admitting controlled quantities of returning gases to said combustion chamber from said housing, and
pressurizing means for producing a greater than atmospheric pressure throughout said combustion chamber,



housing, dryer, and feed conduit means and in said return conduit means during operation.

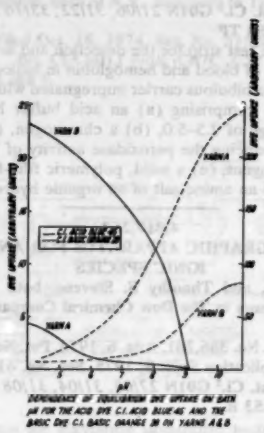
4,017,255
DYED TEXTILE MATERIALS

Malcolm Carnie Cobb, Ponthir, England, assignor to Imperial Chemical Industries, London, England

Continuation of Ser. No. 876,218, Dec. 1, 1969, abandoned, which is a continuation of Ser. No. 519,336, Jan. 7, 1966, abandoned. This application May 20, 1974, Ser. No. 471,742

Int. Cl.² D06P *3/854*

U.S. Cl. 8—21 B **5 Claims**



1. A process for the manufacture of fiber materials containing at least two groups of differently dyed nylon filaments which comprises forming a fiber structure of filaments of which at least some are composed of nylon, said nylon filaments being of two distinct types in which a first type is composed of a nylon having a substantially homogeneous equal content of about 90 to 110 microequivalents per gram of carboxyl end groups and an amine end group content of about 20 to 30 microequivalents per gram, a second type of fiber composed of nylon having a substantially homogeneous equal content of about 20 to 30 microequivalents per gram of carboxyl end groups and about 90 to 110 microequivalents of amine end groups, said difference is carboxyl end group content between said two nylons being at least about 60 microequivalents per gram of polymer, and dyeing the fiber structure with a dye liquor containing a cationic dyestuff, under such conditions, including a pH in the dye liquor of at least 6, that said cationic dyestuff dyes said first and second types of filaments to different extents.

4,017,256
PROCESS FOR THE PRINTING AND PAD-DYEING OF MIXED FABRIC

Gerhard Kogel, Reinach; Roberto Degen, and Walter Mundwiler, both of Basel, all of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Mar. 24, 1975, Ser. No. 561,514

Claims priority, application Switzerland, Mar. 28, 1974, 4359/74

Int. Cl.² D06P *3/82*

U.S. Cl. 8—21 C **8 Claims**

1. Process for the printing and pad-dyeing of mixed fabric made from fibre mixtures consisting of materials dyeable with disperse dyestuffs and materials dyeable with reactive dyestuffs by the use of printing pastes or padding liquors containing at least one disperse dyestuff of the azo series and at least one reactive dyestuff, wherein there is used a printing paste or padding liquor in which the disperse dyestuff is formed in the printing paste or padding liquor by the mixing of a coupling component, in the presence of alkalies, with a pasting agent, the subsequent dissolving of the mixture in water, the coupling of the coupling component with a diazo component to form a disperse dyestuff of the azo series, and the subsequent addition of a thickening agent and at least one reactive dyestuff.

3. Process for the preparation of a printing paste or padding liquor containing at least one disperse dyestuff of the azo series and at least one reactive dyestuff, wherein the disperse dyestuff is formed in the printing paste or padding liquor by the mixing of a coupling component, in the presence of alkalies, with a pasting agent, the dissolving of this mixture in water, the coupling of the coupling component with a diazo component to form a disperse dyestuff of the azo series, and subsequently the addition of a thickening agent and at least one reactive dyestuff.

4,017,257
TEXTILES FIRE-RETARDANT TREATED WITH COPOLYCONDENSED VINYLPHOSPHONATES AND PROCESS

Edward D. Weil, Hastings-on-Hudson, N.Y., assignor to Stauffer Chemical Company, Westport, Conn.

Continuation-in-part of Ser. No. 505,123, Sept. 11, 1974, abandoned, which is a division of Ser. No. 187,575, Oct. 7, 1971, Pat. No. 3,855,359, which is a continuation-in-part of Ser. No. 153,075, June 14, 1971, Pat. No. 3,822,327. This application Jan. 31, 1975, Ser. No. 545,862

Int. Cl.² D06M *13/22, 15/62*

U.S. Cl. 8—115.5 **32 Claims**

1. A process for flame retarding textiles, said process comprising applying to a textile an effective concentration of at least one copolycondensed vinylphosphonate and thereafter curing said copolycondensed vinylphosphonate so as to form an insoluble, fire retardant resin in and/or on the fibers of said textile; at least one of said copolycondensed vinylphosphonates consisting essentially of the product resulting from the reaction, in stoichiometric ratio of from about 1:10 to 10:1, between a bis (2-haloalkyl) vinylphosphonate and at least one pentavalent phosphorus ester of the structure ROP(=O)XY where R is selected from the class consisting of C_1–C_{20} alkyl and C_1–C_{20} chloro- or bromoalkyl groups and X and Y are groups selected from the class consisting of RO—, C_1–C_{20} alkyl, C_2–C_{20} alkenyl, phenyl, phenxoy, amino, C_1–C_{20} alkyl substituted amino, phenyl substituted amino, C_2–C_{20} alkylene bonded to the same or to another ROP(=O) moiety and C_2–C_{20} alkyleneoxy and C_2–C_{20} alkylenedioxy bonded to the same or to another ROP(=O) moiety, wherein said reaction is carried out at an elevated temperature for a period of time which is sufficient to evolve R-halide as a by-product and to form a P(O)-O-alkylene-O-P(O) linkage, with the proviso that said product is not the homopolycondensed product of said phenoxy, (2-haloalkyl) vinylphosphonate.

4,017,258
METHOD OF FORMING A PRESSURE SEAL EMPLOYING AN AIR-BALANCE IN A HIGH PRESSURE STEAMER

Yoshikazu Sando; Hiroshi Ishidoshiro, and Matsuo Minakata, all of Wakayama, Japan, assignors to Sando Iron Works Co., Ltd., Japan

Filed June 4, 1975, Ser. No. 583,836

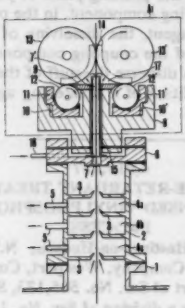
Claims priority, application Japan, June 10, 1974, 49-65819; June 10, 1974, 49-65820

Int. Cl.² D06B *23/18*

U.S. Cl. 8—149.3 **2 Claims**

1. A method of providing a pressure seal for the fiber feed-in and the take-out openings in a high pressure steamer vessel body in which the fiber is treated, comprising steps of providing a roll seal mechanism at the feed-in and take-out openings, forming a tubular chamber for each of the roll seal mechanisms with the tubular chamber open at one end to the roll seal mechanism and at the other end to the interior of the steamer vessel body wherein the fiber is treated, dividing the interior of the tubular chamber into at least three serially arranged intercommunicating sub-chambers with a first sub-

chamber being closest to the roll seal mechanism, a second-sub-chamber being closest to the interior of the steam vessel body and a third sub-chamber being positioned between the other two, supplying a pressurized sealing gas at a pressure corresponding to the pressure within the steam vessel body



into the first sub-chamber, admitting steam from the interior of the steamer vessel body into the second sub-chamber, and intermixing the sealing gas and the steam in the third sub-chamber for forming a sealing gas zone in the first sub-chamber, a steam zone in the second sub-chamber and a mixed gas zone in the third sub-chamber.

4,017,259

CELLULOSE REAGENTS INCORPORATING T-AMINO GROUPS

Clinton P. Wade, Jefferson, and Stanley P. Rowland, New Orleans, both of La., assignors to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.

Filed Oct. 24, 1975, Ser. No. 625,722
Int. Cl.² D06M *13/34*
U.S. Cl. 8—183 **4 Claims**

1. A process for imparting to cellulosic fabric durable press properties, recurability, resistance to hydrolysis, scorch resistance, and sorption of acid dyes and fluorescent brighteners comprising reacting a cellulosic fabric with an aqueous tertiary-amino-N-methylol reagent selected from the group consisting of 2(diethylamino)ethyl N,N-di(hydroxymethyl)carbamate and dimethyloldiethylaminopropyltriazone in the presence or absence of metal salt or acid catalysts.

4,017,260

METHOD OF MEASURING SULPHUR DIOXIDE

Joachim Stauff, Darmstadt; Wolfgang Jaeschke, Kronberg, and Gunter Schlögl, Frankfurt, all of Germany, assignors to Joachim Stauff, Darmstadt, Germany

Filed July 3, 1974, Ser. No. 485,324
Claims priority, application Germany, July 7, 1973, 2334574
Int. Cl.² G01N *33/00*; G01T *1/20*
U.S. Cl. 23—232 E **17 Claims**

1. A method for quantitatively detecting SO_2 comprising the steps of:

providing a water solution of the SO_2 to be detected;

exposing the water solution of SO_2 to a liquid containing a liquid or a solid oxidizer which oxidizes SO_2 to provide chemi-luminescence; and

photoelectrically detecting the chemi-luminescence and its intensity to obtain a representation of the SO_2 concentration in the said water solution.

4,017,261

BIOLOGICAL DIAGNOSTIC TEST STRIP AND METHOD OF PRODUCING SAME

Vlastimil Svoboda, and Olga Celchovska, both of Brno, Czechoslovakia, assignors to Lachema, narodni podnik, Brno, Czechoslovakia

Filed Oct. 16, 1975, Ser. No. 622,833
Claims priority, application Czechoslovakia, Oct. 16, 1974, 7070/74
Int. Cl.² G01N *21/06, 31/22, 33/16*
U.S. Cl. 23—253 TP **7 Claims**

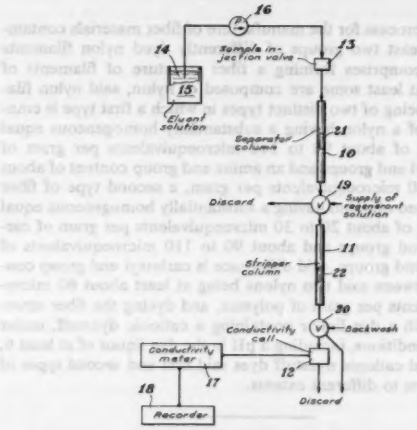
1. Diagnostic test strip for the detection and semi-quantitative estimation of blood and hemoglobin in biological materials comprising a bibulous carrier impregnated with a composition of matter comprising (a) an acid buffer having a pH within the range of 2.5–5.0, (b) a chromogen, (c) an agent capable of enhancing the peroxidase activity of hemoglobin, (d) a wetting agent, (e) a solid, polymeric film-forming substance, and (f) an amine salt of an organic hydroperoxide.

4,017,262

CHROMATOGRAPHIC APPARATUS FOR ANALYSIS OF IONIC SPECIES

Hamish Small, and Timothy S. Stevens, both of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Division of Ser. No. 386,261, Aug. 6, 1973, Pat. No. 3,925,019. This application Sept. 8, 1975, Ser. No. 611,107
Int. Cl.² G01N *27/08, 31/04, 31/08*
U.S. Cl. 23—253 R **4 Claims**



1. Apparatus for chromatographic quantitative analysis of a plurality of species of cations in aqueous sample solution, which comprises:

a first chromatographic column for separating the cationic species, said first column being charged with a cation exchange resin;

means for adding sample solution and solution of developing reagent to the first chromatographic column;

a second chromatographic column for precipitating metal ions contained in said developing reagent, said second column being charged with an anion exchange resin in a form selected from the chloride form and the sulfate form, the anion exchange resin having a total exchange capacity at least 50 times that of the cation exchange resin;

liquid conduit means for conveying effluent from the first column to the second column;

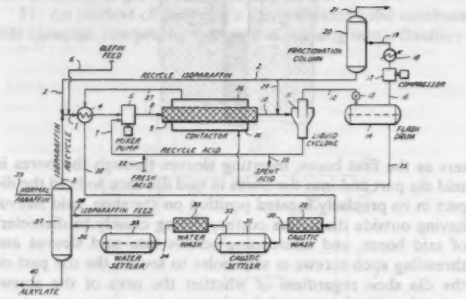
a common detector means for quantitatively detecting each separated cation species of interest exiting from said second column;

and liquid conduit means for conveying effluent from said second column to said common detector means.

4,017,263
APPARATUS FOR SULFURIC ACID CATALYZED ALKYLATION PROCESS

Jeffrey W. Holmes, Sedro-Woolley, Wash.; Bruce K. Purcell, Baton Rouge, La.; William F. Franz, Cardiner, and Edward L. Cole, Fishkill, both of N.Y., assignors to Texaco Inc., New York, N.Y.

Filed Oct. 18, 1974, Ser. No. 515,942
Int. Cl.² B01J *8/08*; C07C *3/54*
U.S. Cl. 23—288 E **3 Claims**



1. Apparatus for alkylating isoparaffin hydrocarbon with olefin hydrocarbon, in the liquid phase, in the presence of sulfuric acid alkylation catalyst, which apparatus comprises:

a. mixing means for forming an emulsion of isoparaffin and olefin reactants and sulfuric acid catalyst;

b. a non-backmixed tubular reactor, having an inlet end, an outlet end and a tubular wall, the inlet of which is in communication with said mixing means, for maintaining the emulsion effluent from said mixing means at alkylation reaction conditions, including a selected temperature of from about −20° F to be about 100° F, an olefin space velocity of from about 0.05 to about 1.0 volumes olefin per hour per volume of acid catalyst and a Reynolds number for said flowing emulsion of at least about 5000 N_{RE};

c. liquid cyclone centrifugal separation means having an inlet in communication with the outlet of said tubular reactor and having a hydrocarbon outlet and an acid catalyst outlet, for rapidly separating reaction emulsion effluent into a liquid hydrocarbon phase comprising unreacted isoparaffin hydrocarbon and alkylate hydrocarbon product, and an acid catalyst phase comprising about 70–100 volume percent acid catalyst and about 30–0 volume percent entrained hydrocarbon;

d. a cooling jacket having inlet and outlet means, surrounding said tubular reactor, defining a confined path for the flow of a refrigerant fluid;

e. a flash drum having an inlet, a top vapor outlet and a bottom liquid outlet, for adiabatically flashing a portion of said separated liquid hydrocarbon phase;

f. first conduit means for conveying separated liquid hydrocarbon phase from said centrifugal separation means to the inlet of said flash drum;

g. a gas compressor, in communication with the top vapor outlet of said flash drum for withdrawing hydrocarbon vapor from said flash drum at a subatmospheric pressure;

h. condensing means in communication with compressor discharge for condensing hydrocarbon vapor from said gas compressor;

i. first fractionation means, in communication with said condensing means, for fractionating condensed hydrocarbon vapor into a first isoparaffin fraction and a fraction lighter than the first isoparaffin fraction;

j. second conduit means for conveying said first isoparaffin fraction from said first fractionation means to said mixing means;

k. third conduit means for conveying cooled, unvaporized hydrocarbon from said flash drum to said cooling jacket inlet;

l. second fractionation means for fractionating separated liquid hydrocarbon phase into a second isoparaffin fraction, a normal paraffin fraction, and an alkylated hydrocarbon fraction;

m. fourth conduit means for conveying liquid hydrocarbon phase from said cooling jacket outlet to said second fractionation means;

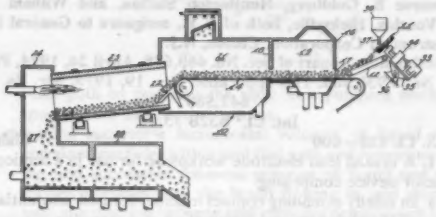
n. means for recycling the second isoparaffin hydrocarbon fraction from said second fractionation means into said second conduit means before the inlet of said mixing means for contact with additional reactant hydrocarbons; and

o. means for recycling acid catalyst phase from said centrifugal separation means to the inlet of said mixing means.

4,017,264
PAN AGGLOMERATION WITH MECHANICAL PELLET CLASSIFICATION

Glenn A. Helan, Franklin, Wis., assignor to Allis-Chalmers Corporation, Milwaukee, Wis.

Filed Feb. 21, 1975, Ser. No. 551,724
Int. Cl.² B01J *2/14*
U.S. Cl. 23—313 R **2 Claims**



1. A method of agglomerating material into pellets exhibiting characteristics of improved strength, abrasion resistivity and size conformity comprising:

a. introducing raw material into a rotating pelletizer pan;

b. moisturizing the raw material as it is introduced into the pan;

c. allowing the moisturized material to travel with the pan to a maximum height whereat the material free-falls in a cascading return flow over the bottom of the pan to the lowest portion of the rotating pan to effect pellet growth;

d. mechanically classifying the material moving with the pan to physically strip at least one layer of predetermined sized moving pellets from the material moving with the pan at a position prior to the material moving with the pan reaching a maximum height at which it free falls and at a position near the outer edge of the pan in the deepest part of the material bed to effect a rapid change in the direction of movement of the predetermined sized moving pellets while allowing smaller pellets and fines to continue to move with the rotating pan to a maximum height for free-fall to the lowest portion of the rotating pan.

4,017,265
FERROMAGNETIC MEMORY LAYER, METHODS OF MAKING AND ADHERING IT TO SUBSTRATES, MAGNETIC TAPES, AND OTHER PRODUCTS

David W. Taylor, P.O. Box 67, Providence Road, Edgemont, Pa. 19028

Filed Feb. 15, 1972, Ser. No. 226,512
Int. Cl.² C25D *5/56, 5/00, 5/10, 5/24*
U.S. Cl. 428—675 **40 Claims**

1. A magnetic memory member comprising;

a. a substrate;

b. a flexible synthetic polymer layer superimposed on a surface thereof, said layer having cyano groups, having a solvent-dispersed phase of catalytic nuclei of platinum, palladium, copper, silver or gold on its surface and concurrently therewith dispersed in the body of the resin;

c. a conductive layer of copper or nickel adhering to said nuclei; and

d. a magnetic layer integrally secured to said conductive layer;

said magnetic layer consisting essentially of substantially pure closely packed hexagonal cobalt which is thin, uniform, continuous and substantially pit-free, having a thickness of about 0.05 to 0.5 microns and a smooth surface approximating optical reflectivity; a nominal coercivity of about 200 to about 500 Oersteds; an inductance of about 6,000 to 16,000 Gauss and a ratio of remnant to saturation induction greater than 0.8 and approaching unity at the extreme, the magnetic memory member having improved information density, frequency response and data rate capability without reduction of output amplitude.

4,017,266

PROCESS FOR MAKING A BRAZED LEAD ELECTRODE, AND PRODUCT THEREOF

Monroe B. Goldberg, Huntington Station, and William B. Voorhis, Hicksville, both of N.Y., assignors to General Instrument Corporation, Clifton, N.J.

Continuation-in-part of Ser. No. 463,678, April 24, 1974, Pat. No. 3,930,306. This application Dec. 19, 1975, Ser. No. 642,588

Int. Cl.² B32B *15/20*

U.S. Cl. 428—600 **7 Claims**

1. A brazed lead electrode workpiece for use in a semiconductor device comprising:

a. an axially extending contact member formed substantially of Molylidenum and terminating at one end in a joining surface;

b. a lead member formed substantially of a thermally and electrically conductive metal and terminating at one end in a joining surface; and

c. a silver/copper-based brazing alloy having a wetting point of at least 450° C brazed with and securing together said joining surfaces of said members, thereby to join said members into a unitary structure.

4,017,267

METHOD OF DIE CONSTRUCTION USING JOINT STRUCTURE

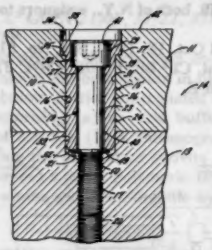
Lee E. Hawley, Janesville, Wis., assignor to Ronald Hawley, Freeport, Ill.; Melvin Enkkeli, Watertown, Wis.; Daniel M. Clark, Rockton, Ill.; William Bryden; Arthur Adams, both of, Beloit, Wis.; Dennis Hillison, Janesville, Wis.; Mrs. Dennis Hillison, Janesville, Wis.; Irving Hillison, Janesville, Wis. and Mrs. Irving Hillison, Janesville, Wis., part interest to each

Filed Mar. 22, 1976, Ser. No. 669,169

Int. Cl.² B23Q *17/18*

U.S. Cl. 29—407 **7 Claims**

1. A method for precisely locating and securing a die part on a die shoe, said method comprising the steps of, forming two bores through said die part, locating said die part in an approximately accurate position on said die shoe, spotting through said bores to locate points on the die shoe for forming threaded holes in the die shoe, forming threaded holes in the die shoe at said points, securing the die part temporarily to the die shoe by means of screws inserted into said bores and threaded into said holes, said screws having a diameter substantially less than the diameter of said bores, checking the accuracy of the approximate position of the die part on the die shoe, shifting the die part on the die shoe as necessary to position the die part precisely on the die shoe, clamping the die part on the shoe adjacent each of the bores, removing the screws from the die part and shoe, forming bores in the shoe in axial alignment with the first bores and to the same diameters as the first bores, inserting sleeves through the bores in said die part and into the bores in said die shoe to hold the die part in its precisely located position on the shoe, said sleeves having outside diameters corresponding closely to diameters of said bores, and telescoping screws into said sleeves and threading such screws in said holes to secure the die part on the die shoe regardless of whether the axes of the screws coincide with the axes of the sleeves.



4,017,268

HYDROCARBON FUEL CONTAINING DISPERSED HYDROGEN AND METHOD OF USE THEREOF

E. Gene Gilley, 1506 Mulberry Road, Martinsville, Va. 24112

Filed Feb. 12, 1975, Ser. No. 549,144

Int. Cl.² C10L *1/10*

U.S. Cl. 44—52 **7 Claims**

3. A liquid hydrocarbon fuel comprising a mixture of a liquid hydrocarbon fuel having a specific gravity below 0.75 with a liquid hydrocarbon having a specific gravity above 0.75 and having bubbles of gaseous hydrogen dispersed therein, the resulting mixed fuel having a specific gravity of at least about 0.75.

4,017,269

METHOD AND ARRANGEMENT FOR GASIFYING FINELY DIVIDED FLUIDIZED SOLID COMBUSTIBLE MATERIAL

Karl-Heinz Dutz, Herten, and Adolf Linke, Essen, both of Germany, assignors to Krupp-Koppers GmbH, Essen, Germany

Continuation of Ser. No. 345,204, March 26, 1973, abandoned. This application May 22, 1975, Ser. No. 579,816

Claims priority, application Germany, Mar. 25, 1972, 2214737

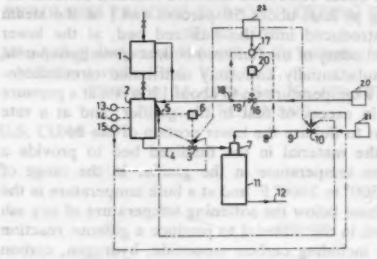
Int. Cl.² C10J *3/50*

U.S. Cl. 48—86 R **20 Claims**

1. An arrangement for converting finely divided solid combustible material into gaseous form, comprising, in combination, a first container containing finely divided solid combustible material to be fluidized; a second container containing an inert fluidizing gas incapable of supporting combustion; an inert gas supply conduit having one end connected to said second container for receipt of said gas and having an other end for discharge of said gas and an adjustable regulating valve in said conduit intermediate said ends; fluidizing means having a first inlet connected to said first container for receipt of said material and having a second inlet connected to said other end of said inert gas supply conduit for receipt of said gas, and having an outlet for discharge of the fluidized material; combustion gas supply means operative for supplying a

combustion-supporting gas; gasifying means having a first inlet connected to said combustion gas supply means for receipt of said combustion-supporting gas and having a second inlet connected to said outlet of said fluidizing means for receipt of said fluidized material; negative feedback stabilizing means automatically operative for maintaining the pressure of the fluidized combustible material entering said gasifying means higher than the pressure of gas in said gasifying means, to prevent backflow of combustion-supporting gas in said gasifying means through said second inlet of said gasifying means, by automatically adjusting said regulating valve, and thereby varying the flow of inert gas through said inert gas supply conduit, in dependence upon the difference between the pressure of the inert gas in said inert gas supply conduit and the pressure of gas in said gasifying means.

11. An method of gasifying a finely divided solid combustible material, comprising the steps of passsing into a fluidizer a



finely divided solid combustible material and also through an inert gas supply conduit an inert fluidizing gas incapable of supporting combustion and causing said finely divided solid combustible material to be fluidized in said fluidizer; passing the fluidized solid combustible material into a gasifier; passing a combustion-supporting gas into said gasifier; reacting said fluidized material and said combustion-supporting gas in said gasifier to said produce gaseous combustible material and discharging the produced gaseous combustible material from said gasifier; and maintaining the pressure of the fluidized combustible material entering said gasifier higher than the pressure of gas in said gasifier, to prevent backflow of combustion-supporting gas in said gasifier, by adjusting a regulating valve in said inert gas supply conduit to vary the flow of inert gas into said fluidizer in dependence upon the difference between the pressure of the inert gas entering said fluidizer and the pressure of the gas in said gasifier.

4,017,270

COAL GASIFICATION PROCESS WITH IMPROVED PROCEDURES FOR CONTINUOUSLY FEEDING LUMP COAL UNDER PRESSURE

Erwin D. Funk, and Michael I. Sherman, both of Glens Falls, N.Y., assignors to Kamyr, Inc., Glens Falls, N.Y.

Continuation-in-part of Ser. No. 438,273, Jan. 31, 1974, abandoned. This application Jan. 20, 1975, Ser. No. 542,407

Claims priority, application South Africa, July 29, 1974, 74/4815

Int. Cl.² C10J *3/06, 3/30*

U.S. Cl. 48—197 R **12 Claims**

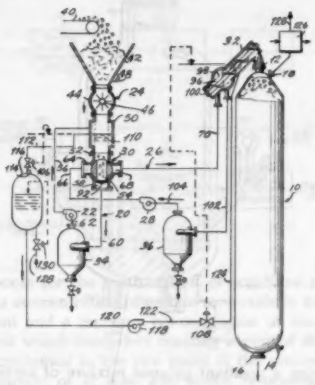
1. A process of producing gas from gas producing material, such as coal, having a predetermined particle size range, such as approximately ¼ inch nominal diameter to approximately 2 inches nominal diameter, by continuously feeding a supply of such particles into inlet means of gasifier means under a predetermined elevated inlet pressure where the particles are continuously heated under pressure to produce gas by procedures which are detrimentally affected by the presence of substantial amounts of fine particles of a size less than said predetermined size range, the improvement wherein said continuous feeding comprises the steps of:

confining a liquid within a first path including a first volume defining a first free surface exposed to pressure conditions which are low with respect to the elevated inlet pressure of said gasifier means,

introducing a supply of particles of said size range into the liquid within said first confined path downwardly through the free surface thereof,

confining liquid within a second path which is circuitous and includes a second volume defining a second free surface communicating with the elevated pressure of the inlet means of said gasifier means,

continuously circulating the liquid within said second circu-



itous path by pumping the same at a pumping position spaced from said second volume,

removing successive incremental volumes of liquid and entrained particles within said first path and communicating said successive removed volumes of liquid and entrained particles with the liquid flowing in said second path at a position between said pumping position and said second volume,

collecting the particles of said size range within said second volume, and

moving the collected particles upwardly through said second free surface and into the inlet means of said gasifier means.

4,017,271

PROCESS FOR PRODUCTION OF SYNTHESIS GAS

Kenneth M. Barclay, Woodland Hills; James R. Birk, San Jose, and William E. Parkins, Woodland Hills, all of Calif., assignors to Rockwell International Corporation, El Segundo, Calif.

Filed June 19, 1975, Ser. No. 588,563

Int. Cl.² C10K *1/00;* **C10J** *3/00*

U.S. Cl. 48—197 R **12 Claims**

1. A process for producing a synthesis gas capable of being upgraded to a pipeline gas, which process comprises:

providing a reaction zone containing a molten salt consisting essentially of a major portion of sodium carbonate and a minor portion of at least 1 wt.% of sodium sulfide, said molten salt containing carbon in an amount of about 1 to 10% by weight of the molten salt and having a total solids concentration of less than about 25 wt.%,

maintaining said molten salt at a temperature between about 1400° and 2000° F,

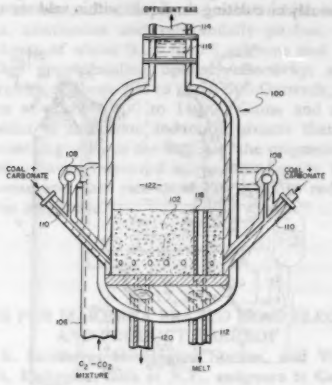
introducing a sulfur-containing carbonaceous material, substanially pure oxygen, and recycled carbon dioxide from the process into said molten salt reaction zone, said substantially pure oxygen and carbon dioxide being introduced in an amount sufficient to provide about 0.6 to about 1.2 mole of carbon dioxide per mole of oxygen,

controlling the foregoing conditions without the introduc-

tion of steam to promote CO production and decompose said carbonaceous material, whereby the sulfur component of the carbonaceous material is retained in the molten salt, the reaction being carried out at a pressure between 1 and 100 atmospheres,

obtaining from said reaction zone an initial gaseous effluent containing carbon monoxide, hydrogen, hydrocarbons and carbon dioxide, and being essentially free of sulfur-containing pollutants,

subjecting said gaseous effluent to a water gas shift reaction,



recovering a resultant gaseous mixture of carbon dioxide, carbon monoxide and hydrogen from said shift reaction,

removing the carbon dioxide from said resultant gaseous mixture,

recycling a portion of said carbon dioxide for introduction thereof into said molten salt reaction zone, and

separately recovering from the carbon dioxide removal process a substantially carbon-doxide-free synthesis gas capable of being upgraded to a pipeline gas.

4,017,272

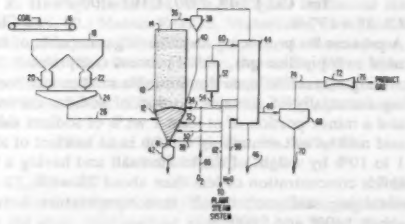
PROCESS FOR GASIFYING SOLID CARBONACEOUS FUEL

Jamil Anwer, Cologne, Germany; Ira Norman Banchik, Lakeland, Fla.; Gerhard Wilhelm Bode, Lechenich, Germany; Werner Lemberg, Cologne-Weidenpesch, Germany, and Kuldip Kumar Sud, Cologne, Germany, assignors to Bamag Verfahrenstechnik GmbH, Germany

Continuation-in-part of Ser. No. 584,130, June 5, 1975, abandoned. This application May 27, 1976, Ser. No. 690,549

Int. Cl.² C10J *3/16*; C10K *1/20*

U.S. Cl. 48—197 R **28 Claims**



1. An efficient and economical process for continuously gasifying particulate carbonaceous material under selective conditions to produce, in an environmentally-acceptable manner, a gaseous product rich in carbon monoxide and hydrogen using pressurized gasifier means having a lower, dense-phase, fluidized bed of the material and contiguous to the upper phase boundary of the bed, an upper dilute-phase, particulate-entrained, gas zone which comprises

introducing, in the gasifier, particulate carbonaceous material at a pressure slightly in excess of the pressure in the gasifier, at a temperature from about ambient to 1,000° F., and with amounts of the material at a rate sufficient to maintain the upper phase boundary of the fluidized bed at a given level of about 4 to 20 feet above the lower phase boundary of the fluidized bed wherein the ratio of the height of the diute phase, gas zone to the height of the fluidized bed is from about 3:1 to 10:1;

introducing oxygen-containing gas with up to about 50 percent (vol.) of steam at average bulk temperatures up to about 1000° F., at a pressure slightly in excess of that in the gasifier, at spatially-separate points, substantially uniformly distributed circumferentially, at different levels in the gasifier and in amounts sufficient to substantially uniformly contact and gasify the constituents of the fluidized bed under controlled selective reaction conditions;

introducing at least about 50 percent (wt.) of the steam being introduced into the fluidized bed, at the lower phase boundary of the fluidized bed, at spatially-separate points, substantially uniformly distributed circumferentially, at a temperature up to about 1200° F., at a pressure slightly in excess of that in the gasifier, and at a rate sufficient to fluidize the lower portion of the bed;

gasifying the material in the fluidized bed to provide a maximum temperature in the gasifier in the range of about 1500° to 2400° F. and at a bulk temperature in the dense phase below the softening temperature of any ash contained in the material to produce a gaseous reaction product including carbon monoxide, hydrogen, carbon dioxide, methane and diluents, which product evolves into the dilute phase, and in conjunction with such production partially spent char solids are produced;

introducing additional increments of oxygen-containing gas with up to about 10 percent (vol.) of steam at or just above the phase boundary between the fluidized bed and dilute phase at spatially-separate points, substantially uniformly distributed circumferentially, in amounts sufficient to react with carbon values leaving the fluidized bed, thus increasing the temperature in the dilute-phase, and to enhance the carbon-conversion efficiency of the process to provide a raw product gas containing at least about 50 percent of the oxidized carbon in the form of carbon monoxide;

passing the gaseous reaction product through the dilute phase at a superficial velocity well above the point of incipient fluidization and up to about 20 feet per second, and for a residence time in the dilute-phase of about 2 to 5 seconds to undergo further gasification and produce a raw product gas, maintaining the dilute-phase at a maximum temperature possible commensurate with the properties of any contained ash;

removing the raw product gas from said upper dilute-phase zone;

removing up to about 60 percent (wt.) of partially spent char from the bottom of the bed and containing the char with steam being introduced into the bed at the lower phase boundary to recover sensible heat from the char and preheat the steam;

providing a cooled product gas from said raw product gas, said cooled product gas having less than about 4 grains of solid per standard cubic foot of gas at approximate gasifier pressures and at temperatures better suited for further processing, wherein substantial amounts of partially spent char are removed from the raw product gas for discharge from the process or for recycle or for reprocessing under different conditions, and wherein the cooling of the raw product gas to temperatures of about 200° F. to 500° F. is conducted in a heat recovery zone to recover heat values;

employing recovered heat values from said heat recovery zone to produce steam, a portion of which is utilized in the process;

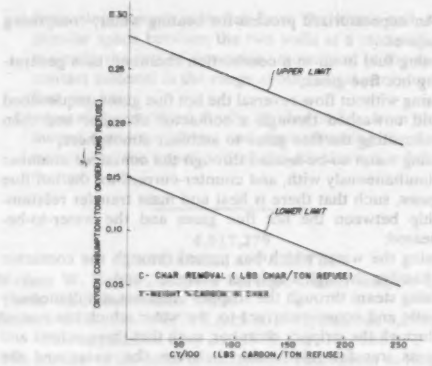
conducting the cooled product gas, cooled in a heat recovery zone at the heat recovery zone pressures, which are less than the pressures in the gasifier, through a high efficiency, high pressure-drop type, scrubber to remove fine partially spent char particles and provide a gas product containing less than about 0.1 grains of solids per standard cubic foot of gas, a carbon monoxide content of at least about 10 percent (vol.), a hydrogen content of at least about 10 percent (vol.), and a BTU content of at least about 90 BTU per standard cubic foot; and

maintaining the pressure in the gasifier at super-atmospheric pressures including pressures above about 1.5 atmospheres absolute by means of back-pressure control applied to the gas system at a point downstream of the gasifier.

4,017,273
PYROLYSIS PROCESS FOR CONVERTING REFUSE TO FUEL GAS

John Erling Anderson, Katonah, N.Y., assignor to Union Carbide Corporation, New York, N.Y.

Filed May 26, 1976, Ser. No. 690,187
Int. Cl.² C10J *3/00*
U.S. Cl. 48—209 **2 Claims**



1. In a process for disposing of refuse while simultaneously producing a useful gaseous product and an inert solid residue, comprising the steps of (a) feeding refuse into the top portion of a vertical shaft furnace, (b) feeding an oxygen containing gas into the base of said furnace, (c) pyrolyzing the organic portion of the refuse, (d) fluidizing the inorganic portion of the refuse, (e) discharging the gaseous products from the top of said furnace, and (f) tapping the fluidized inorganic material from the base of said furnace, the improvement comprising:

removing char from the furnace in an amount such that oxygen consumption in said process is reduced, while retaining a sufficient amount of combustible materials in the furnace so that on oxidation thereof the energy requirements of the process are satisfied, the amount of char removed (lbs. char/ton refuse) being less than the value of 50X/Y,

where:

X = lbs. carbon contained in a ton of refuse

Y = weight percent (%) carbon in the char and wherein the range of oxygen consumption for a given amount of char removed will be within the values determined by the equation:

$R = B - (4 \times 10^{-4})(CY)$

where:

R = oxygen consumption (tons oxygen/ton refuse)

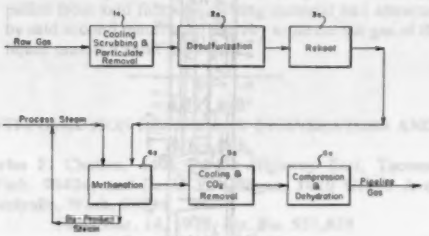
C = char removal (lbs. char/ton refuse)

Y is the same as above, and B can vary between 0.15 and 0.28.

4,017,274
PROCESS FOR THE METHANATION OF GASES CONTAINING HIGH CONCENTRATION OF CARBON MONOXIDE

Lionel S. Galstaun, New York, N.Y., assignor to Bechtel Associates Professional Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 493,082, July 30, 1974, abandoned, which is a continuation of Ser. No. 272,418, July 17, 1972, abandoned. This application Feb. 26, 1976, Ser. No. 661,565
Int. Cl.² C10K *3/04*; C10G *13/30*
U.S. Cl. 48—214 A **14 Claims**



1. A process for the methanation of scrubbed raw gases containing a concentration of carbon monoxide in excess of 3 mole percent and a methane concentration of less than 25 mole percent which comprises reacting a part of the carbon monoxide contained in the raw gases in the presence of an effective amount of at least one steam reforming catalyst contained in a fixed bed, substantially adiabatic reactor with steam, water, or a steam and water mixture provided directly to the reaction zone to effect the shift conversion of a part of the carbon monoxide according to the equation

$$CO + H_2O = CO_2 + H_2$$

and simultaneously to effect methanation of the remaining carbon monoxide with hydrogen up to the equilibrium point of the equation

$$CO + 3H_2 = CH_4 + H_2O$$

the amount of steam, water, or steam and water mixture being sufficient to maintain the temperature of the reactants below that at which cracking of the methane product in the methanation reaction can take place.

4,017,275
CENTRIFUGAL SEPARATOR

Robert A. Hodgson, and Charles K. Gravis, both of Tulsa, Okla., assignors to Maloney-Crawford Tank Corporation, Tulsa, Okla.

Filed Mar. 8, 1973, Ser. No. 339,311
Int. Cl.² B01D *45/12*
U.S. Cl. 55—1 **11 Claims**

1. A centrifugal separator for separating liquid from gas, comprising:

a. a vertically oriented cylindrical shell having a top, bottom, and cylindrical wall;

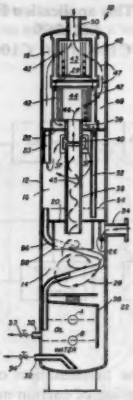
b. said shell divided into three chambers, a first bottom chamber separated from a second central chamber by a first transverse dividing wall, and a third top chamber separated from said second chamber by a second transverse dividing wall;

c. an inlet pipe entering said first chamber near said first dividing wall, through which a mixture of liquid gas is introduced into said first chamber, and means to impart a tangential flow of said mixture in said first chamber;

d. means to withdraw separated liquid from the bottom of said first chamber;

e. an axial tube sealed through said first and second dividing walls, said tube formed of two parts, spaced slightly apart to form a narrow gap in the wall of said tube, said gap positioned in said second chamber;

f. means utilizing the flow of the liquid-gas mixture in said separator to create a zone of low pressure in said second chamber;



g. conduit means within said cylindrical shell to communicate said zone of low pressure with said third chamber; and

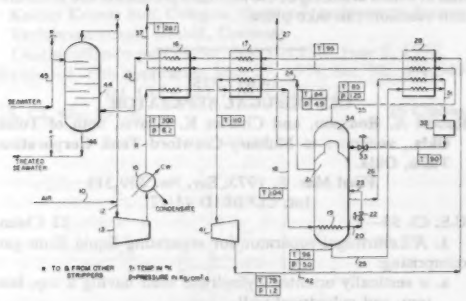
h. means to remove gas from said third chamber through a mist extractor.

4,017,276

DEOXYGENATION OF WATER

Bert Bloem, Waddinxveen, Netherlands, assignor to The Lummus Company, Bloomfield, N.J.

Filed June 22, 1976, Ser. No. 698,317
Int. Cl.² B01D *19/00*
U.S. Cl. 55—51 **8 Claims**



1. A process for deoxygenating water, comprising:

stripping oxygen from the water, said stripping being effected with a nitrogen stripping gas;

recovering oxygen containing nitrogen stripping gas from said stripping;

fractionating the oxygen containing nitrogen stripping gas to recover nitrogen; and

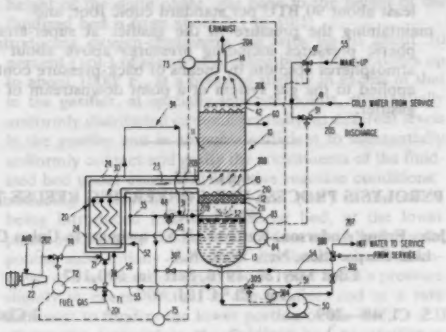
employing recovered nitrogen as stripping gas for said stripping.

4,017,277

DIRECT CONTACT WATER HEATING SYSTEM AND PROCESS

Bingham H. Van Dyke, Sr., 19 Olde Benchmark Village, and Bingham H. Van Dyke, Jr., 127 Roboda Blvd., both of Royersford, Pa. 19468

Filed Feb. 6, 1975, Ser. No. 547,698
Int. Cl.² B01D *19/00*
U.S. Cl. 55—54 **20 Claims**



1. An unpressurized process for heating water, comprising the steps of:

burning fuel in air in a combustion chamber, thus generating hot flue gases;

passing without flow-reversal the hot flue gases unquenched and unwashed through a contactor chamber and then exhausting the flue gases to ambient atmosphere;

passing water-to-be-heated through the contactor chamber simultaneously with, and counter-current to, the hot flue gases, such that there is heat and mass transfer relationship between the hot flue gases and the water-to-be-heated;

passing the water which has passed through the contactor chamber through a stripper chamber; and

passing steam through the stripper chamber simultaneously with, and counter-current to, the water which has passed through the stripper chamber, such that there is heat and mass transfer relationship between the water and the steam, thereby stripping out dissolved gases such as CO_2 and O_2 from the heated water, and thereby also increasing the temperature of the water.

4,017,278

METHOD AND APPARATUS FOR REMOVING FINELY DIVIDED SOLIDS FROM GAS

Richard G. Reese, Woodside, Calif., assignor to Combustion Power Company, Inc., Menlo Park, Calif.

Filed Sept. 30, 1974, Ser. No. 510,291
Int. Cl.² B01D *46/04*
U.S. Cl. 55—96 **8 Claims**

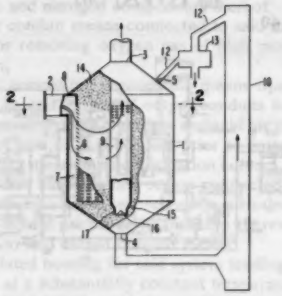
1. A process for removing finely divided solids from gas which comprises:

a. providing an elongated annular mass of particulate contact material confined between two generally concentric cylindrical walls, the outer wall being perforated to form a louvered surface having vanes extending outwardly and inclined to the vertical at an angle of about 15° to 80° and louver openings sufficiently large to permit passage of most of the particles constituting the contact mass to pass through the openings and the inner wall having perforations which permit passage of the gas through the wall,

b. passing a feed gas containing finely divided solids through the outer wall and through the annular mass of contact material into the space enclosed by the inner cylindrical wall,

c. withdrawing gas having a substantially reduced content of finely divided solids from the space enclosed by the inner wall,

d. moving the mass of particulate contact material downwardly by gravity flow through the annular space between the two walls at a rate between about one-half foot per hour and forty feet per hour whereby a minor proportion of the contact material passes through the louvers of the outer wall,



e. removing contact material from the lower end of the annular space between the two walls at a rate such as to maintain the rate of downward movement of the mass of contact material in the range about ¼ foot per hour to 40 feet per hour,

f. separating entrained finely divided solids from the removed contact material and then returning the contact material to the upper end of the annular space between the two walls.

4,017,279

DEFOAMER APPARATUS

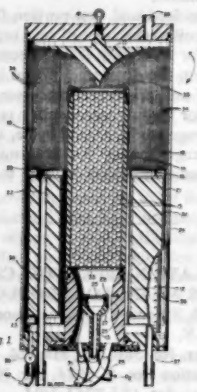
Wallace W. Bowley, Stafford Springs, Conn., assignor to Intech, Inc., Manchester, Conn.

Division of Ser. No. 295,724, Oct. 6, 1972, Pat. No. 3,898,045. This application May 29, 1975, Ser. No. 581,971

The portion of the term of this patent subsequent to Aug. 5, 1992, has been disclaimed.

Int. Cl.² B01D *19/02*

U.S. Cl. 55—178 **14 Claims**



1. Apparatus for defoaming a liquid material, said apparatus being adapted and configured to fit within a container having an inlet for the liquid material, an outlet for removing the liquid of the material being defoamed and an outlet for removing the gas of the material being defoamed, said apparatus comprising:

multiple layers of fabric arranged in confronting, closely adjacent, surface contacting relationship, said fabric comprising:

a first material having non-wetting characteristics; and

a second material having a lesser degree of nonwetting characteristics than said first material, said second material being arranged in closely adjacent relationship with said first non-wetting material;

wherein the liquid of the material being defoamed is repelled from said first non-wetting material and attracted by said second material to thereby separate the gas of the liquid material from the liquid.

4,017,280

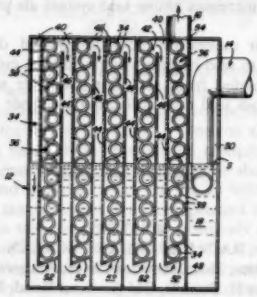
ANTI-POLLUTION DEVICE FOR INCINERATORS AND THE LIKE

Charles F. Cleman, 4401 Pacific Highway East, Tacoma, Wash. 98424, and David E. Gilligan, 1010 Grand Ave., Centralia, Wash. 98531

Filed Mar. 14, 1975, Ser. No. 558,829

Int. Cl.² B01D *47/02*

U.S. Cl. 55—255 **6 Claims**



1. An anti-pollution device for polluted gaseous medium from incinerators and the like, comprising, in combination: a tank having an inlet for the gaseous medium and an outlet for cleaned gases, and holding a bath of a washing solution; single blower means having an input and output connected to said tank but mounted outside thereof for creating a flow of a gaseous medium being cleaned between the inlet and the outlet of the tank and having another input, a line having one end connected to the tank and in communication with the bath and having the other end connected to said another input, said blower means inducting the washing solution through said line for cooling the blower means, and baffle means for creating a large surface across the flow of gaseous medium and facilitating separation of particulate matter from the medium being cleaned arranged in the tank, and partially immersed in the bath, between the output of said blower means and the tank outlet.

4,017,281

INDUSTRIAL VACUUM LOADER WITH DUST REMOVAL MEANS FOR BAG HOUSE FILTRATION SYSTEM

Duncan Johnstone, P.O. Box 574, Lannon, Wis. 53046

Filed Oct. 2, 1975, Ser. No. 618,945

Int. Cl.² B01D *50/00*

U.S. Cl. 55—334 **6 Claims**

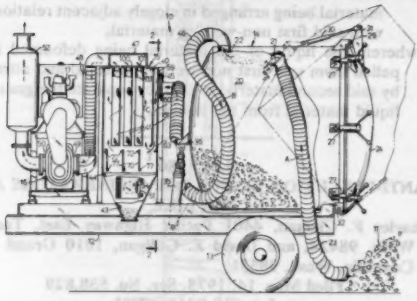
1. An industrial vacuum loader for handling dust-laden particulate material comprising;

a hopper having a material inlet port and an air outlet port;

a housing having an air inlet port connected to said air

outlet port of said hopper and comprising a first chamber containing filtering means and a dust collecting chamber below said filtering means, said dust collecting chamber being communicable with said first chamber;

a blower connected to said housing to maintain system air pressure below atmospheric pressure in said hopper and in said housing whereby material can be drawn into said hopper and whereby dust-laden air from said hopper is drawn through said filtering means;



means for isolating said dust collecting chamber from said first chamber so that air pressure in said dust collecting chamber increases above said system air pressure in said hopper;

and conduit means for connecting said dust collecting chamber to said hopper while said dust collecting chamber is isolated from said first chamber so that dust is drawn from said dust collecting chamber into said hopper.

4,017,282

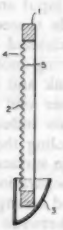
RAIN RETARDANT SCREEN

Joseph G. Zahka, 16A Deerwood Drive, Amherst, N.H. 03031, and Ruthven H. Daniels, Old Amherst Road, Mount Vernon, N.H. 03057

Continuation-in-part of Ser. No. 371,297, June 18, 1973, abandoned. This application May 22, 1975, Ser. No. 579,909

Int. Cl.² B01D *39/10*

U.S. Cl. 55—428 **18 Claims**



1. A water retardant screen which retards the passage of water drops therethrough from an outer surface exposed to a water-containing atmosphere to an inner surface thereof and allows the passage of light rays and air therethrough comprising:

a screen mesh having fine pore diameter and moderate percent open area, said mesh having said inner and said outer surface;

said outer surface having a contact angle with water greater than 90°; and

said inner surface having a contact angle with water less than 90°.

4,017,283

METHOD AND PLANT FOR MAKING UP NITROGEN VAPORIZATION LOSSES IN NITROGEN-CONTAINING LIQUIFIED NATURAL GAS CARRYING TANKERS

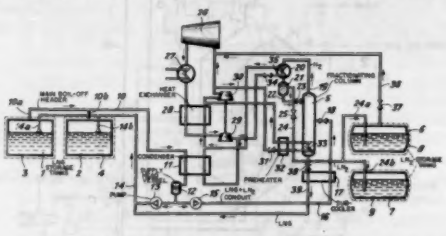
Karel Witt, Volketswil, Switzerland, assignor to Sulzer Brothers Limited, Winterthur, Switzerland

Continuation of Ser. No. 304,900, Nov. 9, 1972, abandoned. This application Oct. 17, 1974, Ser. No. 515,539

Claims priority, application Switzerland, Nov. 17, 1971, 16685/71

Int. Cl.² F25J *1/02*

U.S. Cl. 62—40 **5 Claims**



1. In combination with the hold of a tanker, a plant for obtaining liquified nitrogen for use aboard said tanker from a liquified natural gas body being transported in said hold of said tanker; said plant comprising primarily a fractional distillation column; and a closed looped nitrogen refrigerant cycle;

said column further comprising a condenser coil, a reboiler coil, and an overhead liquid nitrogen receiver having at least one outlet for feeding liquified nitrogen not required for column reflux to at least one storage vessel,

said cycle further comprising at least a primary compressor, a brake compressor and an expansion turbine,

conduit means for feeding nitrogen refrigerant from the discharge of said primary compressor to the inlet of said turbine,

conduit means for feeding at least a portion of said refrigerant from the discharge of said turbine through an expansion valve to the inlet of said condenser coil of said column,

conduit means for feeding said portion from the outlet of said condenser coil to the inlet of said brake compressor,

conduit means for feeding at least a first portion of the refrigerant from the outlet of said brake compressor through an expansion valve to the inlet of said reboiler coil of said column,

conduit means to feed said first portion from the outlet of said reboiler coil to the inlet of said brake compressor,

conduit means for feeding at least a second portion of the refrigerant from the discharge of said brake compressor to the inlet of said primary compressor

conduit means for feeding nitrogen for refrigerant makeup from said storage vessel to said cycle, and

mechanical linkage means for transmitting mechanical energy from said expansion turbine to said brake compressor.

4,017,284

AIR DISTILLATION APPARATUS COMPRISING REGENERATOR MEANS FOR PRODUCING OXYGEN

William E. Gifford, Syracuse, N.Y., assignor to Cryox Corporation, Eden, N.Y.

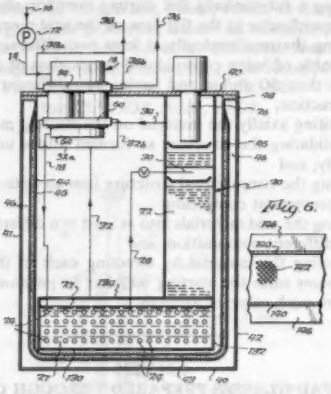
Continuation of Ser. No. 360,397, May 14, 1973, abandoned. This application Dec. 6, 1974, Ser. No. 530,231

Int. Cl.² F25J *3/04*

U.S. Cl. 62—40 **10 Claims**

1. A system for liquefying air, separating the oxygen and nitrogen components of the liquiefied air and delivering oxygen gas of high purity comprising:

a. a distillation column having a rectification region, a source of refrigeration above said region and heat exchanger means below said region, said heat exchanger means being in a bath of liquid oxygen during operation of said system;
b. input conduit means connected to said heat exchanger means for providing input air to be liquefied;
c. means connecting said heat exchanger means to said recitification region of said distillation column for transmitting liquefied air to said region for separation into the oxygen and nitrogen components thereof;
d. output conduit means connected to said distillation column for removing oxygen gas of high purity from said column;
e. means comprising regenerator means operatively connected to said input and output conduits for exchanging heat between said oxygen gas and said air to be liquefied whereby said air is precooled prior to entering said heat exchanger means in said distillation column, said regenerator means having a first region connected to said input conduit means and a second region surrounding said first region in heat exchange relationship therewith and connected to said output conduit means;
f. an insulated housing for said system tending to keep said system at a substantially constant temperature; and
g. a plurality of perforated plates of heat conducting mate-



rial in said first region and in heat exchange relationship with said second region for transferring heat between said regions.

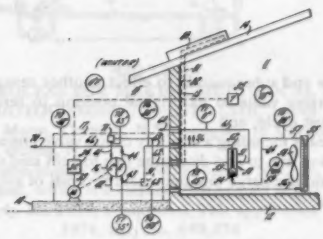
10. A system for liquefying air, separating the oxygen and nitrogen components of the liquiefied air and delivering oxygen gas of high purity comprising:
a. a distillation column having a rectification region, a source of refrigeration above said region and heat exchanger means below said region, said heat exchanger means being in a bath of liquid oxygen during operation of said system;
b. input conduit means connected to said heat exchanger means for providing input air to be liquefied;
c. means connecting said heat exchanger means to said rectification region of said distillation column for transmitting liquefied air to said region for separation into the oxygen and nitrogen components thereof;
d. output conduit means connected to said distillation column for removing oxygen gas of high purity from said column;
e. means comprising regenerator means operatively connected to said input and output conduits for exchanging heat between said oxygen gas and said air to be liquefied whereby said to air is precooled prior to entering said heat exchanger means in said distillation column, said regenerator means having a first region connected to said input conduit means and a second region surrounding said first region in heat exchange relationship therewith and connected to said output conduit means;
f. an insulated housing for said system tending to keep said system at a substantially constant temperature; and
g. packing material in said first region of said regenerator means for removing particulate material from the air and a plurality of thread members in said region.

4,017,285

HEAT PUMP-REFRIGERATION SYSTEM WITH WATER INJECTION AND REGENERATIVE HEAT EXCHANGER

Thomas C. Edwards, Oviedo, Fla., assignor to The Rovac Corporation, Rockledge, Fla.

Filed Oct. 30, 1975, Ser. No. 627,114
Int. Cl.² F25B *13/00*
U.S. Cl. 62—2 **8 Claims**



1. A heat pump-refrigeration system comprising, in combination, a cool space, a relatively warm space separated therefrom by an insulating oarrier, a unitary compressor and expander having rotor means driven by a common shaft, the rotor means having vanes defining enclosed compartments which cyclically become smaller and larger as the shaft rotates, the compressor and expander each having an inlet port and an outlet port so that air is positively compressed and elevated in temperature in the compressor and positively expanded and lowered in temperature in the expander, a regenerative heat exchanger having first and second thermally coupled air passages, a primary heat exchanger in the warm space having an air passage thermally coupled to the air in the warm space, an initial air inlet for conducting air from the cool space into the first passage of the regenerative heat exchanger, means for conducting the air from said first passage to the compressor inlet port, means for conducting the air from the compressor outlet port to the primary heat exchanger, means for conducting the air from the primary heat exchanger to the second air passage of the regenerative heat exchanger, means for conducting the air from the said second air passage to the inlet port of the expander, and a final air outlet for conducting air from the outlet port of the expander to the cool space so that heat is effectively pumped from the cool space to the warm space to increase the temperature differential between them, and means for injecting water in finely divided form into the air stream which enters the compressor.

4,017,286

HEAT PUMP SUCTION LINE VENT

William A. English, Franklin, Pa., and Charles J. Robinson, Norman, Okla., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

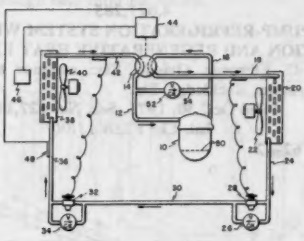
Filed Dec. 22, 1975, Ser. No. 642,808
Int. Cl.² F25B *13/00, 41/00*
U.S. Cl. 62—160 **3 Claims**

1. A heat pump system including:
refrigerant compressor means;
a first refrigerant coil selectively operable as a condenser and as an evaporator;
a second refrigerant coil selectively operable as an evaporator and as a condenser in reverse relation to said first coil;
a reversing valve;

a refrigerant discharge line, and a refrigerant suction line, connecting said compressor means to said reversing valve;

refrigerant lines connecting each of said coils to said reversing valve, and a refrigerant line connecting said coils;

control means to effect a rapid reversal of said reversing valve while said compressor is running to initiate a defrost



cycle and subsequently to effect another reversal of said reversing value to its original position to terminate the defrost cycle; and

line means including a one way check valve connecting said suction line to said discharge line to vent said suction line to said discharge line upon said reversal of said reversing valve.

4,017,287

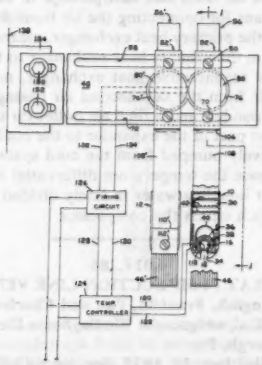
CONTROL APPARATUS AND SYSTEM FOR CLOSELY SPACED HEATING ELEMENTS FOR FORMING GLASS FIBERS AND METHOD OF USING SAME

Thomas H. Jensen, Murrysville, Pa., assignor to PPG Industries, Inc., Pittsburgh, Pa.

Continuation of Ser. No. 563,930, March 31, 1975, Pat. No. 3,969,098, which is a continuation-in-part of Ser. No. 531,942, Dec. 12, 1974, abandoned, which is a continuation-in-part of Ser. No. 320,381, Jan. 2, 1973, abandoned. This application Jan. 20, 1976, Ser. No. 650,818

Int. Cl.² C03B *37/02*

U.S. Cl. 65—2 **3 Claims**



1. In a glass fiber forming system in which glass fibers are formed from an elongated tubular bushing operating under positive pressure other than glass head pressure and in which the elongated tubular bushing is electrically controlled, the improvement comprising providing along incremented lengths of the bushing gaseous cooling fluid means which are adjustable, and adjusting one or more of said means in response to a need for more or less gaseous cooling fluid to corresponding incremented lengths during the operation of the bushing.

4,017,288

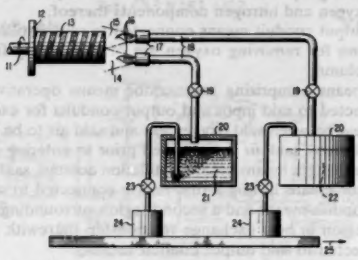
METHOD FOR MAKING OPTICAL FIBERS WITH HELICAL GRADATIONS IN COMPOSITION

William George French, Plainfield, and John Burnette MacChesney, Stirling, both of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Dec. 15, 1975, Ser. No. 640,577

Int. Cl.² C03B *37/02*; C03C *25/02*

U.S. Cl. 65—2 **4 Claims**



1. In a method of producing optical fibers with longitudinal gradations in index of refraction comprising:

rotating a substantially flat starting member about an axis perpendicular to the flat face of the said member;

forming thermochemically at least two different materials capable of being consolidated into a glass of optical loss less than 50 db/km and having two different indices of refraction;

depositing axially the material on the starting member;

consolidating the structure so formed into a unitary glass body; and

drawing the consolidated structure into an optical fiber the improvement comprising

forming the said materials into at least two different streams of different composition; and

depositing the material by directing each of the material streams onto the starting member to positions differing from each other in azimuth.

4,017,289

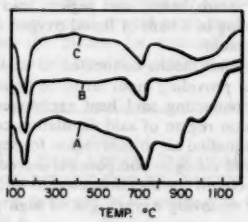
OPAL GLASSES PREPARED THROUGH CLAY VITRIFICATION

Syed N. Hoda, Horseheads, N.Y., assignor to Corning Glass Works, Corning, N.Y.

Continuation-in-part of Ser. No. 679,983, April 26, 1976, abandoned. This application Aug. 9, 1976, Ser. No. 712,480

Int. Cl.² C03B *23/20*; C04B *33/13*, *7/00*

U.S. Cl. 65—18 **9 Claims**



1. A method for making an opal glass comprising the steps of:

A. a bentonite clay exhibiting a DTA curve free from a sharp rise in slope at about 900° C., having a cation exchange capacity of about 100–200 milliequivalents/100 grams, and consisting essentially, in weight percent on the

oxide basis, of about 57–78.5% SiO_2, 13.8–23% Al_2O_3, 0–4% MgO, 0–5% Fe_2O_3, 0–2.5% CaO, 0–5.4% Na_2O, and 0–0.5% K_2O, is treated with an aqueous solution of a sodium and/or potassium salt to exchange sodium and/or potassium ions with other cations present in said clay to obtain a mono-cationic derivative having a composition within the Na_2O/K_2O-Al_2O_3-SiO_2 system;

B. the ion exchanged clay is washed with water;

C. the washed clay is dried;

D. the dried clay is shaped into a desired form; and

E. the clay shape is fired to vitrification in accordance with the schedule:

a. the clay shape is dried;

b. the clay shape is dehydroxylized and carbonaceous material is burned out by heating to about 700°–900° C.; and then

c. the clay shape is vitrified by heating to about 950°–1200° C.

4,017,290

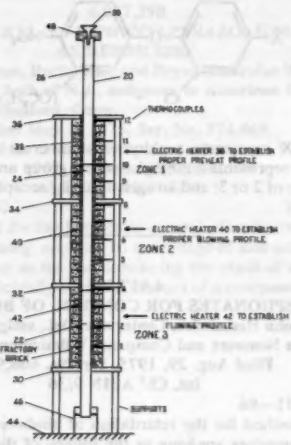
METHOD AND APPARATUS FOR MAKING UNIFORM PELLETS FOR FUSION REACTORS

Ronald G. Budrick, Ann Arbor, Mich.; Frank T. King, Hillsboro, Oreg.; Alfred J. Martin; Robert L. Nolen, Jr., both of Ann Arbor, Mich., and David E. Solomon, Ann Arbor, Mich., assignors to KMS Fusion, Inc., Ann Arbor, Mich.

Filed Apr. 15, 1974, Ser. No. 463,860

Int. Cl.² C03B *19/10, 19/08*

U.S. Cl. 65—21 **4 Claims**



1. A method of forming sized microspheres which comprises:

a. separating glass frit into a plurality of quantities of predetermined selected sizes in the range of 50 to 90 micrometers,

b. heating a vertical drop tube from outside the tube to temperature ranges between 800° and 1300° C,

c. closing the top of the tube with a closure and the bottom of said tube with a quantity of receiving liquid to prevent down or updraft,

d. feeding a quantity of a selected size of frit into the top of said heated tube and recovering said frit as microspheres in said liquid, and

e. repeating said feeding step with a different selected size in each instance to provide a plurality of microspheres of differing sizes.

4,017,291

PROCESS FOR THE TREATMENT OF GLASS BY METAL MIGRATION

Georg Gliemeroth, Finthen, and Lothar Meckel, Ostrich, both of Germany, assignors to Jenaer Glaswerk Schott & Gen., Mainz, Germany

Filed June 10, 1976, Ser. No. 694,595

Claims priority, application Germany, June 16, 1975, 2526804

Int. Cl.² C03C *21/00*

U.S. Cl. 65—30 R **16 Claims**

1. A process for the treatment of glass for the purpose of varying properties of the glass, comprising the steps of applying a vapor-coating of at least one metal onto the surface of said glass and thereafter heating said metal coating and said glass substrate, in the absence of oxygen, to a temperature sufficient to cause said metal to migrate from the surface of said glass into said glass without any residue remaining on the surface of said glass.

4,017,292

PROCESS FOR MAKING MULTIFOCAL PHOTOCHROMIC OPHTHALMIC LENS

George H. Mann, Corning, N.Y., assignor to Corning Glass Works, Corning, N.Y.

Continuation-in-part of Ser. No. 636,126, Nov. 28, 1975, abandoned, which is a continuation-in-part of Ser. No. 491,786, July 25, 1974, abandoned. This application Jan. 15, 1976, Ser. No. 649,474

Int. Cl.² C03B *32/00, 11/08;* C03C *3/04*

U.S. Cl. 65—33 **5 Claims**

5. A process for manufacturing a photochromic multifocal ophthalmic lens comprising a major lens portion composed of a photochromic glass and at least one lens segment fused to the major lens portion composed of a glass having a higher index of refraction than the major lens portion, comprising the steps of:

a. providing a major lens portion composed of a silver halide-containing glass which is potentially photochromic, said glass consisting essentially, in weight percent on the oxide basis, of about 48–57% SiO_2, 6–10% Al_2O_3, 15–22% B_2O_3, 0.8–2% Na_2O, 2.4–3.1% Li_2O, 0–4% K_2O, 3.2–7.2% $Na_2O + Ki_2O + K_2O$, 4.5–5.3% PbO, 3–9% BaO, 0–7.2% ZrO_2, 0.10–0.6% Ag, 0.01–0.10% CuO, 0.15–1.2% Cl, 0–1.0% Br, 0–0.1% I and 0–1.2% F;

b. subjecting the potentially photochromic major lens portion to a nucleating heat treatment above the annealing point of the glass for a time sufficient to initiate the growth of silver halide crystals therein, but insufficient to render the glass photochromic, to provide a nucleated major lens portion;

c. combining the nucleated major lens portion with at least one lens segment composed of a glass having a higher index of refraction than the major lens portion;

d. subjecting the nucleated major lens portion and lens segment to a fusion heat treatment at a temperature near the softening point of at least one of the glasses for a time sufficient to develop photochromic properties in the nucleated major lens portion and fuse the lens segment thereto; and

e. cooling the fused major lens portion and lens segment.

4,017,293

HEAT TREATING AND SAGGING LENS BLANKS

Edwin J. Illig, Corning, N.Y., assignor to Corning Glass Works, Corning, N.Y.

Filed May 27, 1976, Ser. No. 690,623

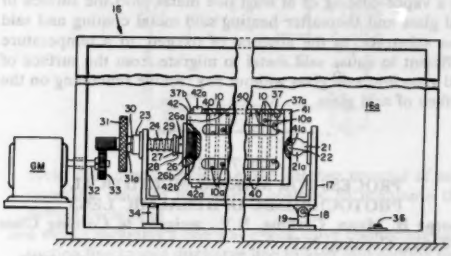
Int. Cl.² C03B *23/02, 32/00*

U.S. Cl. 65—107 **6 Claims**

1. A method of heat treating a plurality of flat geometrically congruent glass lens blanks made from a phototropic glass composition which requires, or it is expedient to subject to, for

development of the phototropic properties thereof, a heat treatment at a temperature above the softening point temperature of such glass for a predetermined period of time, such method comprising the steps of:

A. forming a stack by alternately positioning similar areas of the flat surfaces of each of said lens blanks, adjacent the perimeters thereof, between the flat surfaces of two flat spacer members having hollows extending from one flat surface through the other flat surface thereof, such hollows having perimetric configurations corresponding to perimetric configurations desired for eyeglass lenses to be subsequently made from said lens blanks;



B. disposing said stack in a tube whose hollow has a cross-sectional shape complemental to the outer peripheries of said lens blanks and supplying force to the ends of said stack to clamp the lens blanks;

C. rotating said tube and said lens blanks about the longitudinal axis of such tube while horizontally oriented and while evenly heating such lens blanks to said development temperature for said period of time; and

D. terminating said heating and permitting the glass of said lens blanks to become set up.

4,017,294

FURNACE OUTLET

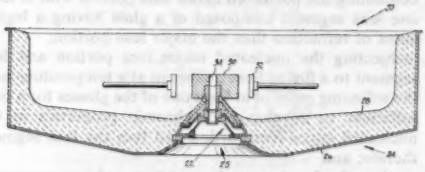
Steve Douglas Sanford, Richmond, Ind.; Vaughn Charles Chenoweth, Hollanburg, Ohio, and Duane Harold Faulkner, Cambridge City, Ind., assignors to Johns-Manville Corporation, Denver, Colo.

Continuation of Ser. No. 491,885, July 25, 1974, Pat. No. 3,912,488. This application Sept. 4, 1975, Ser. No. 610,211

The portion of the term of this patent subsequent to Oct. 14, 1992, has been disclaimed.

Int. Cl.² C03B 5/26

U.S. Cl. 65—326 **15 Claims**



1. In an electric furnace for melting glass and other high melting point materials at temperatures exceeding 2500° F. said furnace including a vessel, means for electrically heating and melting the materials with the vessel, and an outlet means extending through a wall of said vessel from the interior of said furnace to the exterior of said furnace for withdrawing molten material from said vessel, the improvement comprising:

said outlet means including a first outlet orifice having one end in the interior of said vessel and through which molten material passes upon withdrawal from said vessel, said first outlet orifice comprising a corrosion resistant metal having a melting point in excess of 2500° F, but which must be protected from an oxidizing atmosphere at the temperature of the molten material, and means for shielding said first outlet orifice from an oxidizing atmosphere without the need for the use of a neutral or reducing gas surrounding the outlet, said shielding means consisting essentially of a second outlet orifice below said first outlet orifice, said second outlet orifice being made from a material having a higher resistance to oxidation from air than the metal in said first outlet orifice, said second outlet orifice being located in a recess in the bottom of said vessel and fluid cooling means at least partially surrounding said second outlet orifice for maintaining said second outlet orifice at a temperature below its critical or melting temperature.

4,017,295

HERBICIDAL COMPOSITION

Ryohei Takahashi; Isao Yokomichi, both of Kusatsu; Kazuyuki Maeda, Hikone, and Takahiro Haga, Kusatsu, all of Japan, assignors to Ishihara Sangyo Kaisha Ltd., Osaka, Japan

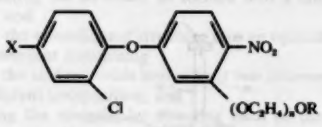
Filed July 21, 1975, Ser. No. 597,677

Claims priority, application Japan, July 24, 1974, 49-84249

Int. Cl.² A01N 9/20

U.S. Cl. 71—66 **3 Claims**

1. A method of controlling aquatic and hygrophytic weed-growth which comprises applying to paddy fields or dry fields a herbicidally effective amount of a herbicidal composition which comprises an active ingredient of a diphenylether having the formula



wherein X represents a chlorine atom or a trifluoromethyl group; R represents a methyl or ethyl group and *n* represents an integer of 2 or 3; and an agriculturally acceptable adjuvant.

4,017,296

PHOSPHONATES FOR CONTROL OF BINDWEED

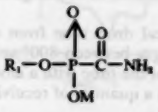
Turney John Hernandez, Centerville, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Aug. 29, 1975, Ser. No. 608,908

Int. Cl.² A01N 9/36

U.S. Cl. 71—86 **4 Claims**

1. A method for the retardation of bindweed on cropland which comprises applying to the foliage of the bindweed an effective amount of a compound selected from the compounds having the formula



wherein

R_1 is alkyl of 1 to 3 carbon atoms or allyl; and

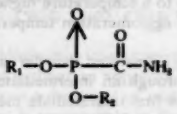
M is hydrogen, ammonium, sodium, lithium, or potassium, and then proceeding immediately to plant crops on said cropland whereby there is substantially no injury to said crops.

4,017,297
PHOSPHONATES FOR THE CONTROL OF BINDWEED

Turney John Hernandez, Centerville, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Aug. 29, 1975, Ser. No. 608,907
Int. Cl.² A01N 9/36
U.S. Cl. 71—86 4 Claims

1. A method for the retardation of bindweed on cropland which comprises applying to the foliage of the bindweed a herbicidally-effective amount of a compound selected from compounds having the formula



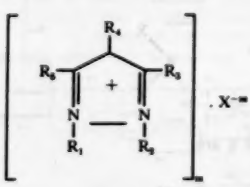
wherein R_1 and R_2 independently can be alkyl of 1 to 3 carbon atoms or allyl, and then proceeding immediately to plant crops on said cropland whereby there is substantially no injury to said crops.

4,017,298
1,2,4-TRIALKYL-3,5-DIPHENYLPYRAZOLIUM SALTS AS HERBICIDES

Barrington Cross, Rocky Hill, and Bryant Leonidas Walworth, Pennington, both of N.J., assignors to American Cyanamid Company, Stamford, Conn.

Filed May 2, 1975, Ser. No. 574,068
The portion of the term of this patent subsequent to Dec. 30, 1992, has been disclaimed.
Int. Cl.² A01N 9/22
U.S. Cl. 71—92 14 Claims

1. A method for the herbicidal control of undesirable plant species comprising: applying to the foliage of said undesirable plant species, or to the soil containing the seeds of said plant species, a herbicidally effective amount of a compound having the formula:



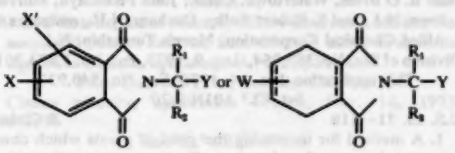
wherein R_1 and R_2 each represent C_1–C_4 alkyl, R_3 represents a member selected from the group consisting of C_2–C_4 alkyl, C_3–C_7 cycloalkyl, phenyl and benzyl; R_4 represents a member selected from the group consisting of C_1–C_8 alkyl, allyl, propargyl, carbethoxymethyl and benzyl; R_5 represents a member selected from the group consisting of C_2–C_4 alkyl, C_3–C_7 cycloalkyl and phenyl; X represents an anion having the charge of 1, 2 or 3, and *m* is an integer from 1 to 3.

4,017,299
PHTHALIMIDE DERIVATIVES AS PLANT GROWTH REGULANTS

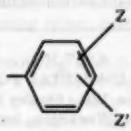
Robert Eugene Diehl, Trenton, and Bryant Leonidas Walworth, Pennington, both of N.J., assignors to American Cyanamid Company, Stamford, Conn.

Division of Ser. No. 382,418, July 25, 1973, Pat. No. 3,940,419, which is a continuation-in-part of Ser. No. 348,355, April 5, 1973, abandoned, which is a continuation-in-part of Ser. No. 282,537, Aug. 21, 1972, abandoned. This application July 23, 1975, Ser. No. 598,458
Int. Cl.² A01N 9/22
U.S. Cl. 71—96 10 Claims

1. A method for regulating the growth of plants comprising: applying to the foliage, roots, stems, seeds, seed pieces or to soil in which the plants are grown, an effective plant growth regulating amount of a compound having the formula:



wherein W is hydrogen or lower alkyl C_1–C_4; X and X′ each represent hydrogen, alkyl C_1–C_4, CF_3, alkoxy C_1–C_4, benzyloxy, di(C_1–C_4) alkylamino, C_1–C_4 alkylthio, hydroxy, C_1–C_4 alkylsulfonyl, halogen, alkanoylamino C_1–C_4 or nitro; Y is —$CONHR_3$, —$COOR_3$, —$CONR_3R_4$, —$CONHN(R_4)_2$, —$CONHN^+(R_4)_3$.halide$^-$, or —CN; R_1 and R_2 each represent alkyl C_1–C_4 or when taken together with the carbon to which they are attached form cycloalkyl C_4–C_{11} optionally substituted with methyl; R_3 and R_4 each represent hydrogen or alkyl C_1–C_4; R_5 and R_6 each represent alkyl C_1–C_2, R_6 is —CH_3 or



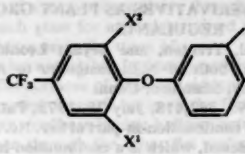
where Z and Z′ are hydrogen, alkyl C_1–C_2, halogen, —CF_3 or —OCH_3 and ⋯ is a single or double bond with the proviso that there be only 0 or 1 double bond in the ring; or mixtures thereof.

4,017,300
HALOGENATED 4-TRIFLUOROMETHYL-DIPHENYL-ETHER HERBICIDAL COMPOSITIONS

Lothar Rohe, Wuppertal; Jürgen Schramm, Dormagen; Erich Klauke, Odenthal-Hahnenberg; Ludwig Eue, and Robert Rudolf Schmidt, both of Cologne, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Division of Ser. No. 483,331, June 26, 1974, Pat. No. 3,957,865. This application Feb. 27, 1976, Ser. No. 662,065
Claims priority, application Germany, July 3, 1973, 2333848
Int. Cl.² A01N 9/12
U.S. Cl. 71—98 12 Claims

1. Herbicidal compositions comprising a herbicidally acceptable carrier and, in effective amounts, a halogenated 4-trifluoromethyl-diphenyl-ether compound of the formula



(I)

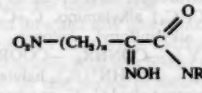
wherein
R^1 is aminothiocarbonyl;
R^2 is hydrogen or methyl;
X^1 is halogen; and
X^2 is hydrogen or halogen.

4,017,301
PLANT GROWTH REGULANTS

John B. O'Brien, Watertown, Conn.; John Pisanchyn, Morristown, N.J., and S. Robert Colby, Durham, N.H., assignors to Allied Chemical Corporation, Morris Township, N.J.

Division of Ser. No. 387,054, Aug. 9, 1973, Pat. No. 3,873,301. This application Jan. 14, 1975, Ser. No. 540,937
Int. Cl.² A01N 9/20
U.S. Cl. 71—118 **8 Claims**

1. A method for increasing the yield of plants which comprises applying to the plants an effective amount of a nitrooximino alkanoic derivative having the general formula:

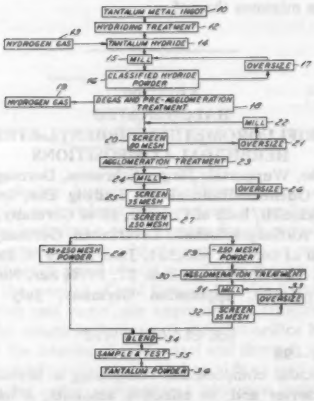


wherein *n* is an integer from 1 to 12 and R and R′ are independently selected from the group consisting of hydrogen, alkyl of 1–12 carbon atoms, cycloalkyl of 3–12 carbon atoms, hydrocarbyl aralkyl of 7–19 carbon atoms, hydrocarbyl alkaryl of 7–19 carbon atoms, hydrocarbyl aryl, alkenyl of 3–12 carbon atoms and alkynyl of 3–12 carbon atoms.

4,017,302
TANTALUM METAL POWDER

Victor T. Bates, Kenosha, Wis.; Stanley S. Fry, North Chicago, and James B. Hakko, Waukegan, both of Ill., assignors to Fansteel Inc., North Chicago, Ill.

Filed Feb. 4, 1976, Ser. No. 655,159
Int. Cl.³ B22F 1/04
U.S. Cl. 75—.5 BB **18 Claims**



1. A method of manufacturing an improved, high-purity agglomerated tantalum powder having high green strength in the absence of a binder which comprises:

a. milling hydrided high-purity tantalum metal ingots to a predetermined particle size powder,
b. subjecting the milled powder to a two-step heat treatment at predetermined temperatures under chemically non-reactive conditions to degas at a first temperature and then to pre-agglomerate the powder at a second and higher temperature,
c. milling and screening the pre-agglomerated powder to separate portions larger than a first intermediate mesh size and milling, such portions and blending with the pre-agglomerated powder to achieve intermediate mesh size powders,
d. heating the blended powder under chemically non-reactive conditions to a temperature higher than the original predetermined agglomeration temperature to agglomerate it,
e. milling the agglomerated powder and screening to a second pass through an intermediate mesh size screen larger than said first intermediate mesh size and a relatively fine no-go mesh size,
f. separating the fines from said screening,
g. heating said fines under chemically non-reactive conditions to an agglomeration temperature,
h. remilling said agglomerated fines to pass the second intermediate screen, and
i. blending all said agglomerated powder to provide a tantalum powder ready for pressing into shapes and sintering to form low density anodes.

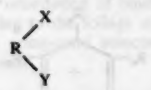
4,017,303
MANUFACTURE OF ACICULAR FERROMAGNETIC METAL PIGMENTS CONTAINING IRON

Eberhard Koester, Frankenthal; Gerd Wunsch, Speyer; Paul Deigner, Weisenheim; Werner Stumpfl, Ludwigshafen, and Hans Henning Schneehage, Mutterstadt, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Germany

Filed July 14, 1975, Ser. No. 595,563
Claims priority, application Germany, July 16, 1974, 2434058
Int. Cl.² B22F 9/00
U.S. Cl. 75—.5 AA **9 Claims**

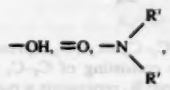
1. A process for the manufacture of acicular ferromagnetic metal pigments, predominantly containing iron, comprising the steps of:

a. dispersing acicular iron oxide in a solution of (i) an alkaline earth metal compound wherein the alkaline earth metal cation of said alkaline earth metal compound is selected from the group consisting of Ca, Ba, and Sr cation, and (ii) an organic compound which contains at least one group which can form chelates of the formula I



(I)

in which X and Y are



wherein R′ is a terminal short-chain carboxylic acid linked to nitrogen by means of an amino bond, R″ is alkyl or aryl and R is a two-membered or three-membered carbon chain or a part of an aromatic ring, whereby said organic compound

forms a chelate with said alkaline earth metal cation in the solvent used to form said solution,

b. removing the solvent by evaporation wherein said chelate is applied to said acicular iron oxide, and

c. reducing the so-treated acicular iron oxide with hydrogen at temperatures of up to 400° C to form metal pigments which retain their acicular shape.

4,017,304

PROCESS FOR SELECTIVELY CHLORINATING THE TITANIUM CONTENT OF TITANIFEROUS MATERIALS

Hans Hellmut Glaeser, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 299,470, Oct. 20, 1972, abandoned. This application Sept. 18, 1973, Ser. No. 398,470

Int. Cl.² C22B *5/10;* **C01G** *23/02;* **C01B** *31/18;* **C21B** *15/00*

U.S. Cl. 75—33 **13 Claims**

1. Process for chlorinating the titanium constituent of a titaniferous material without an appreciable net yield of iron chloride from the iron constituent of said material, whereby said iron constituent is recoverable in the metallic state, by intimately contacting said material with a chlorinating agent at an elevated temperature of 950° to 1400° C. and in the presence of a carbonaceous reductant, said chlorinating agent consisting essentially of $FeCl_2$ and Cl_2, all or part of said chlorinating agent may be in the form of $FeCl_3$, when the chlorinating agent consists essentially of $FeCl_2$ and other chlorine-containing members the ratio in the chlorinating agent of the atoms of chlorine provided by the total of said other chlorine-containing members to $FeCl_2$ being no more than about 4, and the atomic ratio of carbon in said carbonaceous reductant to oxygen in said material being at least about 1, whereby said ratio is at least stoichiometric to produce carbon monoxide.

6. Process according to claim 1 wherein the reaction is carried out to convert at least 85% by weight of the iron in the titaniferous material to metallic iron.

13. Process according to claim 1 wherein the chlorinating agent is a mixture of $FeCl_2$ and $FeCl_3$ and the reaction is carried out to produce an amount of metallic iron in excess of that in the titaniferous material.

4,017,305

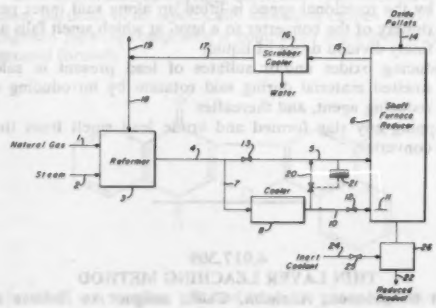
PROCESS FOR HEAT HARDENING

Stephen Waslo, Penn Hills Township, Allegheny County, Pa., assignor to United States Steel Corporation, Pittsburgh, Pa.

Continuation-in-part of Ser. No. 568,332, April 15, 1975. This application Dec. 24, 1975, Ser. No. 644,249

Int. Cl.² C21B *13/02*

U.S. Cl. 75—34 **13 Claims**



1. In the production of metallized pellets by the gaseous reduction of iron oxide particles in a shaft furnace the method of thermally densifying said particles to increase the ignition temperature and strength of the product comprising the steps of:

a. establishing a gravitational flow of said particles by feeding the same to the upper part of said furnace and removing the reduced product from the bottom thereof;

b. passing a reducing gas in counterflow relation to the flow of said particles through said furnace as follows:

i. introducing a first portion of said reducing gas at a temperature sufficient to heat said particles to the level necessary to chemically reduce at least 95 percent of said iron oxide at an upstream location in the particle-flow sense of said furnace; and

ii. introducing a second portion of said reducing gas at a lower temperature at a location downstream of said upstream location, said second portion being in an amount sufficient to maintain the temperature of said particles at a level to thermally densify the reduced particles to raise their ignition temperature to at least 400° F.

4,017,306

PROCESS FOR CONTINUOUS PRODUCTION OF PURE SODIUM

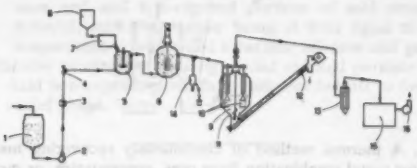
Bernard Batoux, Saint-Marcel; Albert Laurent-Atthalin, Annecy, and Michel Salmon, Saint-Marcel, all of France, assignors to Metaux Speciaux S.A., Paris, France

Filed Dec. 30, 1974, Ser. No. 537,442

Claims priority, application France, Nov. 16, 1973, 73.40816

Int. Cl.² C22B *27/00*

U.S. Cl. 75—66 **4 Claims**



1. A purification process for continuously producing extremely pure, nuclear-grade sodium from commercial-grade sodium containing calcium and barium impurities consisting essentially of the following stages, carried out in the absence of air and moisture:

a. continuously introducing sodium peroxide in a finely divided form into a stream of liquid commercial-grade sodium flowing at a substantially constant rate and at a temperature of between 110° and 120° C, the introduction of the sodium peroxide being continuously metered in a quantity by weight adjusted to between 2 to 8 times the quantity by weight of calcium in the commercial-grade sodium;

b. continuously mixing the sodium peroxide and commercial-grade sodium in a mixing zone at a temperature of between 110° and 130° C by vigorous stirring which enables the particles of sodium peroxide to be wetted by the commercial-grade sodium and to thus suspend and uniformly disperse the particles in the commercial-grade sodium;

c. continuously passing the mixture thus formed to a reaction zone at a temperature in the range from 210° to 230° C, the mixture being subjected to stirring of sufficient intensity to avoid the formation of any appreciable deposits in the mixing and reaction zones, the reaction being accompanied by the formation of calcium and barium oxides which remain substantially suspended in the agitated stream of commercial-grade sodium;

d. continuously flowing the aforesaid reaction mixture to a decantation zone kept at a cooling temperature of between 105° and 115° C;

e. separating the greater part of the suspended particles by decantation;

f. retaining the fine particles remaining in the suspension by filtration at about 105° to 115° C; and

g. recovering from the filtration step a purified sodium containing less than 10 ppm of calcium and less than 5 ppm of barium.

4,017,307

THERMAL METHOD FOR THE RECOVERY OF METALS AND/OR METAL COMBINATIONS WITH THE AID OF A MELTING CYCLONE

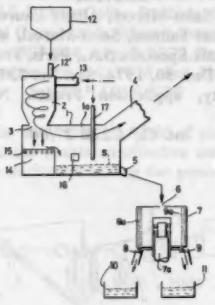
Helmut Winterhager, Aachen; Roland Kammel, Berlin, and Horst Weigel, Cologne-Bruck, all of Germany, assignors to Klockner-Humboldt-Deutz Aktiengesellschaft, Germany

Continuation-in-part of Ser. No. 507,785, Sept. 20, 1974, abandoned. This application Apr. 20, 1976, Ser. No. 678,496

Claims priority, application Germany, Sept. 25, 1973, 2348105

Int. Cl.² C22B *15/00*

U.S. Cl. 75—72 **11 Claims**



1. A thermal method of continuously recovering metals and/or metal combination from ores, concentrates, or metal-containing intermediary products as starting materials, comprising:

continuously charging starting materials into a cyclone reactor and therein continuously melting the starting materials;

continuously discharging molten materials and gases from the reactor into one end of a generally horizontal flow-through buffer hearth chamber within an enclosure;

continuously withdrawing gases from the upper portion of the opposite end of the chamber;

continuously receiving the molten materials discharged from the reactor at said one end of the chamber and flowing the molten materials continuously toward said opposite end of the chamber along a relatively short molten materials flow area along the bottom of said chamber;

continuously discharging the molten materials at a substantially uniform flow rate from said flow area through a discharge opening leading downwardly from said flow area at said opposite end of the chamber;

maintaining the molten materials along the length of said relatively short bottom flow area in the chamber at a temperature substantially as received from the reactor and in a thoroughly fluid state and continuously flowing toward said opposite end of the chamber without additional heating;

buffering the flow volume of said molten materials along said relatively short flow area and assuring a continuous supply of molten materials to said discharge opening even though the discharge output from the reactor may fluctuate;

continuously receiving molten materials downwardly from said discharge opening through an upper end entrance into an upright axis centrifugal separator;

continuously centrifugally separating the molten materials in said separator and about the axis of the separator into a substantially cylindrical metallic phase and a concentric substantially cylindrical slag phase;

and continuously discharging the metallic phase of the molten materials and the slag phase of the molten materials from the lower end of the separator through separate respective exits offset from the axis of the separator and radially spaced from each other.

4,017,308

SMELTING AND REDUCTION OF OXIDIC AND SULPHATED LEAD MATERIAL

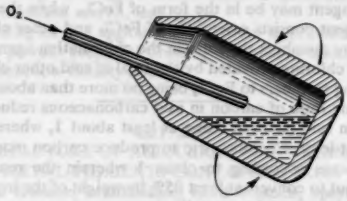
Stig Arvid Peterson, and Sven Anders Lundquist, both of Skelleftehamn, Sweden, assignors to Boliden Aktiebolag, Stockholm, Sweden

Filed Dec. 12, 1974, Ser. No. 532,233

Claims priority, application Sweden, Dec. 20, 1973, 7317217; Dec. 20, 1973, 73172181

Int. Cl.² C22B *13/00*

U.S. Cl. 75—77 **12 Claims**



1. The method of recovering crude lead from materials containing lead substantially in the form of oxides and/or sulfates comprising

charging said materials into a top blown rotary converter with an inclined rotational axis,

smelting said materials with the aid of a flame formed by burning fuel with oxygen over the surface of the bath of smelted material,

rotating the top blown rotary converter at 10–60 r p m and at a speed of 0.5 – 7 m/s measured at the inner periphery of the cylindrical part of the converter and with said rotational axis inclined to the horizontal plane so that the smelted material by means of the friction force induced by the rotational speed is lifted up along said inner periphery of the converter to a level at which smelt falls as finely-divided drops of liquid,

reducing oxides and/or sulfates of lead present in said smelted material during said rotation by introducing a reducing agent, and thereafter

tapping any slag formed and crude lead smelt from the converter.

4,017,309

THIN LAYER LEACHING METHOD

Paul H. Johnson, Anaheim, Calif., assignor to Holmes & Narver, Inc., Anaheim, Calif.

Filed Mar. 28, 1975, Ser. No. 562,962

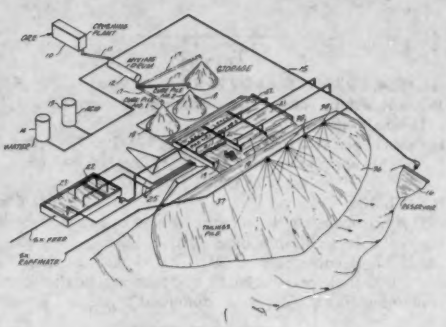
Int. Cl.² C22B *1/00*

U.S. Cl. 75—101 R **64 Claims**

1. A method for leaching material values from particles comprising the steps of:

forming a thin layer of particles having more than about

25% by weight particles larger than about 4 mesh, the thickness of the layer being less than about one and ½



meters; and

percolating a leach liquid downwardly through the layer.

4,017,310

METHOD FOR MAKING STRONTIUM ADDITIONS TO FERROSILICON

James Herbert Downing, Clarence, and James Enoch Wells, III, Kenmore, both of N.Y., assignors to Union Carbide Corporation, New York, N.Y.

Filed Dec. 31, 1975, Ser. No. 645,716

Int. Cl.² C22C *33/00*

U.S. Cl. 75—129 **6 Claims**

1. A method for adding strontium to silicon or ferrosilicon which comprises adding to molten silicon or ferrosilicon at a temperature in the range of 1400° to 1700° C a mixture consisting essentially of carbon and at least one material selected from the group consisting of strontium oxide, strontium carbonate and strontium sulfate, the carbon in said mixture being in substantially the amount required to reduce the selected material and form strontium carbide.

4,017,311

PHOTOELECTROPHORETIC IMAGING SUSPENSION

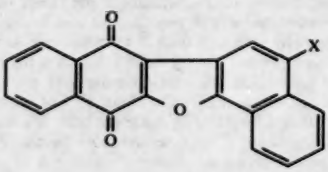
Robert J. Gruber, Pittsford, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Division of Ser. No. 492,555, July 29, 1974, Pat. No. 3,957,829. This application Nov. 10, 1975, Ser. No. 630,479

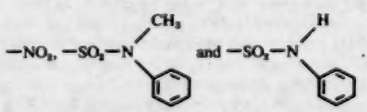
Int. Cl.² G03G *5/06, 9/04*

U.S. Cl. 96—1.5 **4 Claims**

1. A suspension comprising electrically photosensitive pigment particles in an electrically insulating carrier liquid, said pigment particle comprising a compound represented by the general formula



wherein X is a member selected from the group consisting of



4,017,312

METHOD OF MANUFACTURING AN ARTICLE CARRYING A RELIEF IMAGE RECEPTOR MATERIAL COMPRISING EXPOSURE AND HEATING STEPS

William Erskine, Grand-Lancy; Raymond Gerber, Moillesulaz, and Francis Mentienne, Carouge, all of Switzerland, assignors to Mitsubishi Plastics Industries, Limited, Tokyo, Japan and Battelle Memorial Institute, Geneva, Switzerland

Filed Dec. 19, 1975, Ser. No. 642,552

Claims priority, application Switzerland, Dec. 23, 1974, 17218/74

Int. Cl.² G03C *5/00, 5/24*

U.S. Cl. 96—35 **9 Claims**

1. A method of manufacturing an article carrying a relief image suitable for use as a printing plate which comprises:

i. image-wise exposing to appropriate actinic radiation the surface of a photosensitive receptor material having at least a portion of its thickness from the surface comprising a homogeneous mixture of:

a. a solid material whose softening point is altered upon exposure to said actinic radiation such that the exposed and non-exposed portions of said receptor material have different softening points; and

b. at least one substance which releases a gas when heated to a temperature between the softening points of said exposed portions and non-exposed portions of said receptor material;

ii. then heating the exposed receptor material to a temperature between the softening points of said exposed portions and said non-exposed portions of said receptor material, said temperature being at least equal to the temperature at which said substance releases said gas;

thereby causing the swelling of said exposed portions and said non-exposed portions to different heights to form a relief image.

4,017,313

PHOTOSENSITIVE COMPOSITION CONTAINING A LEUCO DYE, A PHOTOSENSITIZER, AN AROMATIC ALDEHYDE AND A SECONDARY OR TERTIARY AMINE AND THE USE THEREOF IN A DIRECT-PRINT PROCESS

Harris Dale Hartzler, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 511,029, Sept. 30, 1974, abandoned. This application July 24, 1975, Ser. No. 599,013

Int. Cl.² G03C *5/24, 1/52*

U.S. Cl. 96—48 QP **21 Claims**

1. A radiation sensitive leuco dye composition which comprises

1. a photosensitive leuco dye which is exidizable to a colored form by exposure to radiation,

2. 0.01 to 50 parts by weight, per part of leuco dye, of photosensitizer for the dye selected from the group consisting of ketones, hexaarylbiimidazoles, and perylene,

3. 0.5 to 100 parts by weight, per part of leuco dye, of an aromatic aldehyde,

4. 0.1 to 10 parts by weight, per part of aromatic aldehyde, of a secondary or tertiary amine is of the formula

in which

R^3 is H; benzyl; or C_1–C_8 alkyl, unsubstituted or substituted, and

R^4 and R^5, alike or different, are C_1–C_8 alkyl, unsubstituted or substituted; cyclohexyl; benzyl; or together form a carbocyclic or hetero-O-cyclic portion of an alicyclic 6-membered ring.

4,017,314

USE OF CROWN COMPOUNDS (CYCLIC POLYETHERS) IN LITHO DEVELOPERS TO IMPROVE HALFTONE DOT QUALITY AND GRADATION

Ralph Kingsley Blake, deceased, late of Union County, N.J. (by June Arlene Blake, executrix), assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Jan. 7, 1976, Ser. No. 647,642
Int. Cl.² G03C 5/30
U.S. Cl. 96—66 R 10 Claims

3. A process for the production of developed photographic material which comprises subjecting photographic lith material containing a latent silver image in a silver halide emulsion layer to development by means of a formaldehyde/bisulphite/-hydroquinone lithographic developer, the process being characterized in that the development takes place in the presence of a crown compound having 5–16 oxygen atoms in a cyclic ring having a total of 14–60 atoms.

4,017,315

MOLYBDATE-PHOSPHATE CORROSION INHIBITING PIGMENT

Mark S. Vukasovich, Ann Arbor, and Francis J. Sullivan, Allen Park, both of Mich., assignors to Amax Inc., New York, N.Y.

Filed June 27, 1975, Ser. No. 590,798
Int. Cl.² C09D 5/08
U.S. Cl. 106—14 11 Claims

1. A corrosion inhibiting pigment comprising discrete particles of an average particle size up to about 25 mircons comprising a mixture of a metal molybdate compound selected from the group consisting of zinc molybdate, calcium molybdate, strontium molybdate, barium molybdate and mixtures thereof and a metal phosphate compound selected from the group consisting of zinc phosphate, calcium phosphate, magnesium phosphate and mixtures thereof, said metal molybdate compound being present on a pigment volume concentration basis of from about 2 parts up to about 3 parts per part of said metal phosphate compound.

11. In a corrosion inhibiting protective coating formulation comprising a vehicle and a solid corrosion inhibiting pigment dispersed substantially uniformly therethrough, said pigment comprising discrete particles of an average particle size up to about 25 microns; the improvement comprising, as said pigment, a mixture consisting of a metal molybdate compound selected from the group consisting of zinc molybdate, calcium molybdate, strontium molybdate, barium molybdate and mixtures thereof and a metal phosphate compound selected from the group consisting of zinc phosphate, calcium phosphate, magnesium phosphate and mixtures thereof, said metal molybdate compound being present on a pigment volume concentration basis of from about 2 parts up to about 3 parts per part of said metal phosphate compound, said corrosion inhibiting pigment being present in said vehicle in an amount sufficient to impart corrosion inhibiting properties thereto.

4,017,316

FIREPROOF STAMPING MASS FOR TAP SPOUTS AND FLUES IN BLAST FURNACES

Albert Lajos Renkey, Dusseldorf-Wittlaer, and Hans-Peter Engelhardt, Krefeld, both of Germany, assignors to Magnesital-Feuerfest GmbH, Oberhausen, Germany

Filed Mar. 26, 1975, Ser. No. 605,246
Claims priority, application Germany, Mar. 28, 1974, 2414965
Int. Cl.² C09D 5/18
U.S. Cl. 106—15 FP 8 Claims

1. An aqueous stamping mass for tap spouts and flues in blast furnaces consisting essentially of

1. 20–60% by weight pyrophyllite ($Al_2O_3.4\ SiO_2.H_2O$) having a particle size of up to 8 mm,
2. 5–30% by weight silicon carbide,
3. 5–20% by weight plastic clay ($Al_2O_3.SiO_2. \times H_2O$),
4. 5–25% by weight quartzite,
5. 5–15% by weight carbonaceous bonding agent having a fusion point of 110°–200° C (without the components becoming gaseous at operating temperature), and
6. a suitable quantity of water for attaining optimal thickness.

4,017,317

GLASS-CERAMICS AND PROCESS FOR MAKING SAME

James R. Rapp, Toledo, Ohio, assignor to Owens-Illinois, Inc., Toledo, Ohio

Division of Ser. No. 169,217, Aug. 5, 1971, Pat. No. 3,984,251.
This application May 10, 1976, Ser. No. 684,615
Int. Cl.² C03C 3/04, 3/22
U.S. Cl. 106—39.6 11 Claims

1. A transparent glass-ceramic formed by in situ crystallization of a crystallizable base glass consisting essentially of about 37–55 mole percent SiO_2, 23–35 mole percent Ta_2O_5 and 20–33 mole percent Na_2O, said transparent glass-ceramic containing $NaTaO_3$ as the predominant crystalline phase.

4,017,318

PHOTOSENSITIVE COLORED GLASSES

Joseph E. Pierson, and Stanley D. Stookey, both of Painted Post, N.Y., assignors to Corning Glass Works, Corning, N.Y.

Filed Jan. 2, 1976, Ser. No. 646,259
Int. Cl.² C03C 3/04, 3/26
U.S. Cl. 106—52 17 Claims

1. A glass article wherein at least a portion thereof is integrally colored by silver, said portion containing microcrystals of alkali fluoride in a concentration of at least 0.005% by volume and having:

a. discrete colloidal particles of metallic silver less than about 200A in the smallest dimension; and/or
b. metallic silver contained within said alkali fluoride microcrystals, said silver-containing part of the microcrystals being less than about 200A in the smallest dimension; and/or
c. a coating of metallic silver on at least a portion of the surface of said alkali fluoride microcrystals, the portion of the microcrystal coated with silver being less than about 200A in the smallest dimension.

4,017,319

Si_3N_4 FORMED BY NITRIDATION OF SINTERED SILICON COMPACT CONTAINING BORON

Charles D. Greskovich, Schenectady, and Svante Prochazka, Ballston Lake, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Jan. 6, 1976, Ser. No. 646,967
Int. Cl.² C04B 35/70, 35/58; F27B 9/10
U.S. Cl. 106—55 9 Claims

1. A process for producing a polycrystalline silicon nitride body by nitridation of a polycrystalline sintered body of silicon which comprises forming a particulate mixture of silicon powder and boron, said silicon powder and said boron having an average particle size less than 3 microns, said boron being present in an amount ranging from 0.1% by weight to 5% by weight of said silicon powder, shaping said mixture into a green body having a density of at least 30% of the theoretical density of silicon, an sintering the green body at a temperature ranging from 1250° C to a temperature below the melting point of silicon in an atmosphere which has no significant deteriorating effect on the green body or the resulting sintered body to produce a sintered body having a density ranging from 60% to 75% of the theoretical density of silicon, said sintering densifying said green body in an amount of at least 2%, and nitriding said sintered body by reacting it in a gaseous nitrogen atmosphere ranging from subatmospheric pressure to superatmospheric pressure at a temperature ranging from 1100° C to below the melting point of silicon to form a polycrystalline silicon nitride body having a density ranging from 79% to 92% of the theoretical density of silicon nitride and comprised of

polycrystalline silicon nitride containing a boron nitride phase in an amount of 0.1% to 8% by volume of the solid phase of said silicon nitride body, and containing unreacted boron-doped silicon in an amount ranging from zero % to 10% by volume of the solid phase of said silicon nitride body.

4,017,320

CERAMIC DIELECTRIC COMPOSITION

Shinobu Fujiwara, and Hitoshi Tanaka, both of Akita, Japan, assignors to TDK Electronics Company, Limited, Tokyo, Japan

Continuation of Ser. No. 449,640, March 11, 1974, abandoned. This application Nov. 19, 1975, Ser. No. 633,237

Int. Cl.² C04B *35/00, 35/46*

U.S. Cl. 106—73.3 **6 Claims**

1. A ceramic dielectric composition comprised of 30 to 94% by mol of $SrTiO_3$, 1 to 22% by mol of Bi_2O_3 and 5 to 69% by mol of TiO_2, and 0.1 to 20% by weight of MgO based on the total weight of the above-mentioned three compounds $SrTiO_3$, Bi_2O_3 and TiO_2, the amount of MgO being selected to provide a ceramic dielectric composition exhibiting reduced dielectric loss factor and reduced variation of the electrostatic capacity with respect to applied temperatures or voltages, as compared to a ceramic dielectric composition containing no MgO; and further including an amount ranging from 0.01 to 10% by weight of at least one of the oxides of the rare earth elements, said amount being selected to provide a ceramic dielectric compositon with reduced dielectric loss factor as compared to a ceramic dielectric composition which is otherwise the same but contains no oxide of the rare earth elements.

4,017,321

VOID FREE ELECTRICAL CEMENT-CONCRETE

David H. Reighter, Roslyn, Pa., assignor to I-T-E Imperial Corporation, Spring House, Pa.

Filed July 11, 1975, Ser. No. 595,179

Int. Cl.² C04B *7/02*

U.S. Cl. 106—98 **9 Claims**

1. A method of producing electrical insulation grade concrete which comprises mixing aggregate, cement and an amount of an aqueous liquid in excess of the amount necessary to cause hardening of the concrete and sufficient to substantially reduce the viscosity of the mixture, applying a vacuum to the resulting mixture sufficient to remove entrained air therefrom, and thereafter removing the excess amount of aqueous liquid under vacuum.

4,017,322

METHOD FOR REINFORCING AQUEOUS HYDRAULIC CEMENT

Motochika Kawai, Fujisawa, and Izuru Shimozawa, Odawara, both of Japan, assignors to Japan Inorganic Material Co., Ltd., Kanagawa, Japan

Continuation of Ser. No. 459,218, April 8, 1974, abandoned. This application June 9, 1975, Ser. No. 584,830

Claims priority, application Japan, Nov. 20, 1973, 48-130545; Nov. 20, 1973, 48-130546; Nov. 20, 1973, 48-130547; Nov. 20, 1973, 48-130548; Nov. 20, 1973, 48-130549; Dec. 21, 1973, 48-143117; Dec. 21, 1973, 48-143118; Dec. 27, 1973, 49-1919; Dec. 29, 1973, 49-4088; Mar. 18, 1974, 49-30823

Int. Cl.² C04B *31/44, 31/06;* **B05D** *1/18*

U.S. Cl. 106—99 **9 Claims**

1. In a method for reinforcing aqueous hydraulic cement wherein glass fibers are incorporated into the cement, the improvement which comprises said fibers containing zirconia and immersing the fibers in an aqueous solution of a compound selected from the group consisting of phosphoric acids, zirconium salts, titanium salts, and hafnium salts at a temperature from 80° to 95° C prior to incorporating the fibers in the cement for a time sufficient to improve the alkali resistance thereof.

4,017,323

PITCH-ALUMINUM PIGMENT COMPOSITION

Charles R. Gannon, Ashland, Ky., assignor to Ashland Oil, Inc., Ashland, Ky.

Continuation of Ser. No. 373,628, June 26, 1973, which is a division of Ser. No. 277,290, Aug. 2, 1972, which is a continuation-in-part of Ser. No. 224,216, Feb. 7, 1972, abandoned. This application Sept. 23, 1974, Ser. No. 508,388

Int. Cl.² C08L *95/00*

U.S. Cl. 106—281 R **4 Claims**

1. A composition for impregnating fibrous tubular bodies in the mamnufacture of pitch impregnated fiber pipe consisting essentially of:

a. molten unoxidized thermal petroleum pitch, and

b. aluminum pigment suspended in said pitch in a concentration of between about 0.1 to about 1.4 percent by weight of pitch-aluminum mixture wherein at least 85% of the aluminum particles in said pigment is in the range of 0.5 to 44 microns.

4,017,324

CLAY SLURRIES

Warren J. Eggers, Aurora, Ill., assignor to IMC Chemical Group, Inc., Terre Haute, Ind.

Filed Feb. 19, 1974, Ser. No. 443,560

Int. Cl.² C09D *1/02;* **C04B** *33/04*

U.S. Cl. 106—288 B **3 Claims**

1. An aqueous slurry of kaolin clay, water, a suspending agent and a dispersant and exhibiting minimum settling, the clay portion consisting essentially of calcined kaolin clay and hydrated kaolin clay in a ratio of about 2.75 parts of said calcined clay to one of said hydrated clay at a total clay content of about 75%.

4,017,325

PIGMENT COMPOSITION

Robert K. Remer, Evanston, Ill., assignor to Hull-Smith Chemicals, Inc., Des Plaines, Ill.

Division of Ser. No. 392,671, Aug. 29, 1973, Pat. No. 3,880,666, which is a continuation of Ser. No. 129,603, March 30, 1971, abandoned. This application Jan. 9, 1975, Ser. No. 539,824

Int. Cl.² C09C *1/48*

U.S. Cl. 106—288 Q **2 Claims**

1. A pigment composition comprising a substrate and a colorant, which substrate is an insoluble multi-valent metal salt of dithiocarbamate formed in an aqueous alkaline medium by the reaction of polyvalent metal ions, amine or amide compounds, carbon disulfide, and water-dispersible inorganic reactive polymeric material.

4,017,326

ENHANCEMENT OF IRIDESCENT COLORS TO PROVIDE VIVID RECORDING COLORS

Chester Davis, 1685 Atson Lane, Cincinnati, Ohio 45205

Division of Ser. No. 549,707, Feb. 13, 1975, and a continuation of Ser. No. 549,706, Feb. 13, 1975. This application Jan. 16, 1976, Ser. No. 649,689

Int. Cl.² C09C *1/28*

U.S. Cl. 106—291 **4 Claims**

1. A composition of matter which comprises

an iridescent pigment of the type comprising an essentially transparent micaceous substrate having thereon at least one overcoating of an essentially transparent material having a refractive index greater than about 2.0,

and discrete finely divided particles of a diluent which is a water-insoluble, essentially transparent solid having a refractive index less than about 1.8,

the particles of said diluent comprising up to about 75% of the weight of said composition,

the diluent particles being admixed among the pigment.

4,017,327
PROCESS FOR PRODUCING MESOPHASE PITCH

Irwin Charles Lewis, Lakewood; Edgar Ronald McHenry, and Leonard Sidney Singer, both of Berea, all of Ohio, assignors to Union Carbide Corporation, New York, N.Y.

Division of Ser. No. 423,718, Dec. 11, 1973, Pat. No. 3,976,729. This application Oct. 31, 1974, Ser. No. 519,761
Int. Cl.² C08L 95/00
U.S. Cl. 106—273 R 6 Claims

1. A process for producing a mesophase pitch having a mesophase content of from 50 percent by weight to 65 percent by weight wherein the mesophase and non-mesophase portions of the pitch are present as a homogeneous emulsion which comprises heating a carbonaceous pitch in an inert atmosphere at a temperature of from 380° C. to 440° C. for a time sufficient to produce a mesophase content of from 50 percent by weight to 65 percent by weight while agitating the pitch during formation of the mesophase so as to produce a homogeneous emulsion of the immiscible mesophase and non-mesophase portions of the pitch.

4,017,328
LEAD CHROMATE PIGMENT WITH IMPROVED THERMAL STABILITY

James Francis Higgins, Livingston, N.J., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Mar. 24, 1975, Ser. No. 561,436
Int. Cl.² C09C 1/20, 1/20
U.S. Cl. 106—298 11 Claims

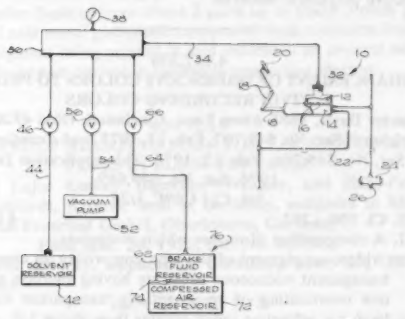
1. In a process for preparing lead chromate pigment in aqueous medium by contacting an aqueous solution containing a soluble salt of chromate and, optionally, at least one soluble salt selected from the group consisting of sulfate and molybdate with aqueous lead salt whereby an aqueous slurry of said pigment is formed and applying at least one hydrous metal oxide to the pigment of the aqueous slurry pigment,

wherein the improvement comprises adding from 0.2 to 1% by weight of a soluble silicate compound, calculated as SiO_2 and based on the weight of the final base pigment, to said aqueous solution prior to precipitation of said pigment.

4,017,329
METHOD OF RESTORING HYDRAULIC SYSTEMS

Philip C. Larson, 23908 Canerwell, Newhall, Calif. 91321

Filed Jan. 7, 1976, Ser. No. 647,287
Int. Cl.² B08B 7/04, 9/06
U.S. Cl. 134—21 4 Claims



1. A method of cleaning and replenishing a hydraulic system having first and second ends, comprising the sequential steps of:

opening the ends of the system to allow hydraulic fluid in the system to drain from the system;

injecting an organic solvent into the system through one end of the system and out the other end of the system, said solvent being miscible with oil and water and vaporizable at low temperatures and at atmospheric pressure;

terminating the flow of solvent and closing the first end of the system;

applying a vacuum to the second end of the system to vaporize the solvent and remove the solvent vapor and air;

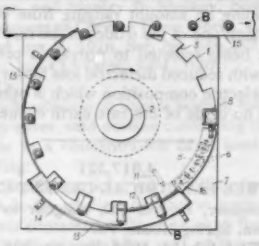
injecting hydraulic fluid into the second end of the evacuated system to fill the system with hydraulic fluid while the vacuum is maintained on the system; and,

closing the second end of the system.

4,017,330
METHOD AND APPARATUS FOR INTERNAL SPRAY CLEANING OF CONTAINERS

Samuel S. Aidlin, 214 Beaumont St., Brooklyn, N.Y. 11235, and Stephen H. Aidlin, 934 Glenwood Road, West Hempstead, N.Y. 11581

Filed Feb. 27, 1976, Ser. No. 662,028
Int. Cl.² B08B 5/04
U.S. Cl. 134—21 13 Claims



1. An apparatus for purging containers from impurities prior to filling as said containers are being continuously conveyed in an opening down orientation by directing separate streams of fluid under pressure through said opening to dislodge and evacuate said impurities from interior surfaces of said containers, said apparatus including: arcuately shaped slotted orifice means disposed in the path of travel of said containers for drawing a negative pressure across said container opening; a plurality of spaced apart orifice means disposed in parallelism to and on either side of said slotted orifice means providing individual pressurized jet streams for action upon said container interior through said container opening; conveyor means for conveying said containers along a predefined path for aligning the central axis of said container openings with the longitudinal axis of said slotted orifice means; overhead restraining means for restraining the movement of said containers while under the influence of said respective streams; and means to position said containers after purging, for advancement on to additional conveyor means for filling.

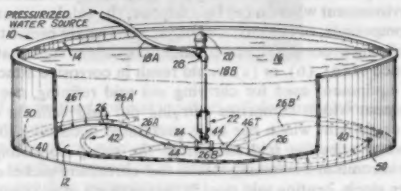
13. A method of purging interior surfaces of containers having openings therein, while continuously advancing in a forward direction on a rotatable conveyor provided with a series of recesses for receiving said containers, advancing each of said containers in the opening down position past a cleaning station for the removal of contaminents and thereafter reorienting each of said containers in the opening up position for further handling, said steps including: advancing said opening down containers in proximity to a plurality of pressurized jet streams disposed about and in axial alignment with an arcuate slotted orifice for drawing a vacuum thereacross, each of said containers being positioned in said conveyor means for advancement along an arcuate centerline of said slotted orifice; introducing said jet streams through each of said container opening at a first pressure level, while simultaneously evacuating said each of said container interior through said openings by a vacuum front at a second pressure level; conveying said

containers beyond said vacuum front; impinging a single jet stream upon the lower most portion of each of said containers for urging said containers to assume a horizontal position; advancing said containers in a forward direction as contact occurs with a curved guide means for gradually urging said containers to assume an opening up position; and conveying said containers in an opening up position to a next work station.

4,017,331
SWIMMING POOL CLEANING APPARATUS

Walter P. Thoelen, Sr., 15 Kamm St., Pequannock, N.J. 07440

Filed Feb. 12, 1976, Ser. No. 657,569
Int. Cl.² B08B 3/02
U.S. Cl. 134—167 R 10 Claims



1. A liquid agitation device particularly useful for maintaining swimming pool debris in suspension in a liquid for removal by the pool filtration system, which device comprises, in combination:

a. a flexible feed conduit for receiving a flow of pressurized liquid for discharge into the liquid;

b. at least one flexible agitation hose in fluid communication with the feed conduit, which agitation hose includes:

i. a bifurcated nozzle, formed by securing two opposed wall portions of the agitation hose together in abutting relationship, located at its distal end whereby the agitation hose is propelled within the liquid in a manner to preclude stalling of the agitation hose; and

ii. a plurality of apertures disposed along the length of the agitation hose for discharging the pressurized fluid for agitating the debris; and

c. means for positioning the feed conduit and agitation hose in the liquid.

4,017,332
SOLAR CELLS EMPLOYING STACKED OPPOSITE CONDUCTIVITY LAYERS

Lawrence W. James, Palo Alto, Calif., assignor to Varian Associates, Palo Alto, Calif.

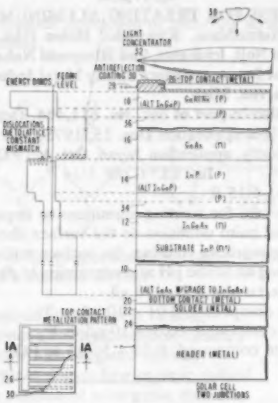
Continuation of Ser. No. 553,850, Feb. 27, 1975, abandoned. This application Mar. 29, 1976, Ser. No. 671,891
Int. Cl.² H01L 31/06
U.S. Cl. 136—89 PC 10 Claims

1. A photovoltaic cell comprising:

a. a first epitaxial layer of semiconductive material comprising a first given compound selected from the group consisting of IIB-VIA, IB-IIIA-VIA, and IIIA-VA compounds, said compound capable of being either *p* or *n* conductivity type, a portion of said layer, starting from the bottom surface thereof, being of a given conductivity type, the remaining portion of said layer, comprising the portion of said layer adjacent the upper surface thereof, being of a conductivity type opposite to said given type and such that a rectifying junction is formed in said layer parallel to the upper and lower surfaces thereof, said layer having a given bandgap and a given lattice constant,

b. a second epitaxial layer of semiconductive material joined to the upper surface of said first epitaxial layer and comprising a second given compound selected from the group consisting of IIB-VIA, IB-IIIA-VIA and IIIA-VA compounds, said compound capable of being either *p* or *n* conductivity type, said layer being of said opposite conductivity type, said layer having a given bandgap at least as high as that of said first epitaxial layer, said layer having substantially the same lattice constant as that of said first epitaxial layer, said second epitaxial layer being joined to the upper surface of said first epitaxial layer so as to form a first heterojunction of like conductivity with the upper portion of said first epitaxial layer,

c. a third epitaxial layer of semiconductive material comprising a third given compound selected from the group consisting of those IIB-VIA, IB-IIIA-VIA and IIIA-VA compounds, said compound capable of being either *p* or *n* type, a bottom portion of said layer, starting from the bottom surface thereof, being of said given conductivity type, the remaining portion of said layer, comprising the portion adjacent the upper surface thereof, being of said opposite conductivity type such that a rectifying junction is formed in said layer parallel to the upper and lower surfaces thereof, said layer having a given bandgap higher than the bandgap of said first epitaxial layer, said third epitaxial layer being joined to the upper surface of said



second epitaxial layer so as to form a second heterojunction of opposite conductivity with said second epitaxial layer, said second and third epitaxial layers comprising means providing a substantial short circuit between said second and third epitaxial layers in a direction opposite to what would be the direction of easy current flow across a rectifying heterojunction formed by said second and third epitaxial layers in absence of said means providing said substantial short circuit.

2. The photovoltaic cell of claim 1 further including a fourth epitaxial layer of semiconductive material joined to the upper surface of said third epitaxial layer and comprising a fourth given compound selected from the group consisting of IIB-VIA, IB-IIIA-VIA and IIIA-VA compounds, said layer being of said conductivity type opposite to said given conductivity type, said layer having a given bandgap at least as high as that of said third epitaxial layer, said layer having substantially the same lattice constant as that of said third epitaxial layer, said fourth epitaxial layer being joined to the upper surface of said third epitaxial so as to form a third heterojunction of like conductivity with the upper portion of said third epitaxial layer.

4,017,333

FINE GRAIN BERYLLIUM BODIES

Donald Webster, Saratoga, and Donald D. Crooks, San Jose, both of Calif., assignors to Lockheed Missiles & Space Company, Inc., Sunnyvale, Calif.

Filed Aug. 25, 1975, Ser. No. 607,675
Int. Cl.² C22F 1/16
U.S. Cl. 148—2 5 Claims

1. A method for reducing cast beryllium and beryllium alloy grain size comprising the steps of

adding to molten beryllium from about 0.01 percent by weight to about 1.0 percent by weight of at least one element selected from the group of elements having atomic numbers 22 through 24, 28, 40 through 42, and 72 through 74, said metal forming a soluble metal beryllide phase in said molten beryllium,

casting and solidifying said melt, said soluble metal beryllide phase precipitating in particulate form 0.5 um or less in diameter in the solid beryllium,

mechanically deforming said casting at least 20 percent below its recrystallization temperature to form an unstable grain structure, and

converting said unstable grain structure into a fine grain structure by annealing said mechanically deformed casting above its recrystallization temperature.

4,017,334

PROCESS FOR TREATING ALUMINUM CANS

Yasunobu Matsushima, Kawasaki; Hideo Oka, Yokohama; Katsuyoshi Noji, Ichikawa, and Hiroyoshi Nakagawa, Yokohama, all of Japan, assignors to Oxy Metal Industries Corporation, Warren, Mich.

Continuation-in-part of Ser. No. 511,404, Oct. 2, 1974, abandoned. This application Dec. 15, 1975, Ser. No. 641,050
Claims priority, application Japan, Oct. 4, 1973, 48-110778
Int. Cl.² C23F 7/14
U.S. Cl. 148—6.15 R 13 Claims

1. In a process for treating aluminum to impart corrosion resistance and paint adhesion to the surface thereof, the improvement comprising treating the surface with an aqueous solution having an acidic pH and containing in dissolved form:

a vegetable tannin: 0.01 – 10 g/l

a titanium compound: 0.01 – 10 g/l as Ti

a fluoride compound: 0.01 – 10 g/l as F

a phosphate compound: 0.01 – 50 g/l as PO_4

4,017,335

LIQUID PHOSPHATIZING COMPOSITION AND USE THEREOF

James E. Maloney, Eagan, Minn., assignor to Economics Laboratory, Inc., St. Paul, Minn.

Filed Oct. 30, 1975, Ser. No. 627,082
Int. Cl.² C23F 7/10
U.S. Cl. 148—6.15 R 13 Claims

1. A method of treating a ferrous metal surface with a phosphatizing composition comprising the steps of:

a. contacting said ferrous metal surface, in a phosphatizing zone, with an organic ammonium phosphate salt solution formed by diluting a liquid concentrate with water in the salt:water ratio of at least 1:5 but less than about 1:250, said concentrate comprising said organic ammonium salt dissolved in water, said concentrate containing less than 1% by weight of any alkali metal containing compound and containing a buffering amount, up to 10% by weight, of an organic ammonium salt buffering compound for stabilizing the pH of said concentrate within the range of about 3.0 to 5.5, said phosphate salt solution having a substantially stabilized pH within the range of about 3.0 to about 5.5, said phosphate salt solution comprising 0.15–15% by weight of said phosphate salt, the organic amine of said organic ammonium salt having a pK_b within the range of about 3 to about 10; said contacting being continued until an iron phosphate coating weight of at least about 10 mg/sq.ft. is obtained on said ferrous metal surface; and

b. rinsing the resulting coated ferrous metal surface with an aqueous rinse composition.

4,017,336

SURFACE TREATMENT OF METALS

Z. Andrew Foroulis, Mendham, N.J., assignor to Exxon Reseaarch and Engineeering Company, Linden, N.J.

Continuation of Ser. No. 241,289, April 5, 1972, abandoned. This application Jan. 7, 1976, Ser. No. 647,063
Int. Cl.² C23F 7/04
U.S. Cl. 148—6.35 6 Claims

1. In a process for the refining of petroleum hydrocarbons in an environment wherein (a) free sulphur, (b) sulphur-containing compounds, or (c) mixtures of (a) and (b) are present and the refining process is operated under conditions such that the presence of (a), (b), or (c) would result in corrosive attack of steel equipment used for carrying out said refining, the improvement which comprises carrying out said refining with steel equipment which has been pretreated according to the following: selecting said steel from the group consisting of steel, chromium-containing steels, and chromium-nickel-containing steels, heating said steel in the presence of an oxidizing environment at temperatures above the expected surface temperature of said steel during said refining; forming a submicroscopic thin barrier on said steel, which barrier is resistant to (a), (b), or (c); and selecting said temperature so as to produce optimum resistance to corrosive attack by (a), (b), or (c).

4,017,337

METHOD FOR PREPARING AN ALUMINUM CLIP

Joseph Winter, New Haven; Richard Lanam, Hamden, both of Conn., and Douglas L. Graham, Ballwin, Mo., assignors to Swiss Aluminium Ltd., Chippis, Switzerland

Filed Apr. 9, 1975, Ser. No. 566,467
Int. Cl.² C22F 1/04
U.S. Cl. 148—11.5 A 8 Claims

1. A method for the preparation of an aluminum paper clip possessing improved corrosion resistance and reduced weight which comprises:

A. providing an aluminum base alloy in rod form, said aluminum base alloy consisting essentially of from about 0.05–6.0% silicon, from about 0.10–0.8% iron, from about 0.02–0.3% copper, from about 0.05–0.20% chromium, from about 0.05–0.20% manganese and from about 4.5–5.6% magnesium, balance aluminum;

B. drawing said rod into wire of a diameter ranging from about 0.035–0.055 inches by a continual drawing operation which is conducted at a speed ranging from about 2,000 to about 4,000 feet per minute without an interannealing treatment; and

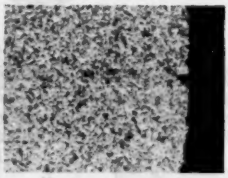
C. bending a finite length of said wire into the shape of a paper clip.

4. The method of claim 1 further including annealing said wire after the completion of said drawing.

4,017,338
STEEL MEMBER FOR REINFORCING RUBBER COMPOSITES AND METHOD OF MAKING SAME

Milan F. Kozak, Raleigh; Mark W. Taylor, Cary, both of N.C., and Ronald C. Elder, Dayton, Ohio, assignors to Monsanto Company, St. Louis, Mo.

Filed Nov. 24, 1975, Ser. No. 634,965
Int. Cl.² C21D 9/52
U.S. Cl. 148—12 B 3 Claims



1. A method for making steel articles for reinforcing rubber composites which comprises:
   a. providing steel stock with a round cross-section having a carbon content of at least 0.35 percent and an essentially pearlitic microstructure;
   b.. forming an essentially rectangular member from said stock wherein said member has an aspect ratio of at least 2; and
   c. heat treating said member to provide a microstructure of tempered martensite, bainite or mixtures thereof.

4,017,339
FLUX FOR USE IN SUBMERGED ARC WELDING OF STEEL

Naoki Okuda, Fujisawa, and Kazuo Tanaka, Yokosuga, both of Japan, assignors to Kobe Steel Ltd., Kobe, Japan

Filed Nov. 29, 1974, Ser. No. 528,554
Claims priority, application Japan, Nov. 29, 1973, 48-135041
Int. Cl.² B23K 35/34
U.S. Cl. 148—24 3 Claims

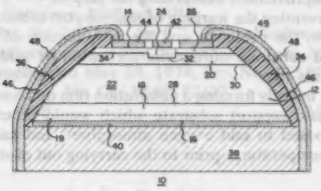
1. A flux composition which is useful in submerged arc welding of steel, which comprises:
   10 – 70% iron powder, 10 – 50% MgO, 3 – 25% CaO, 2 – 25% CO_2 as derived from a carbonate compound, 0.03 – 1.5% B_2O_3 as derived from B_2O_3 itself, a boron compound from which B_2O_3 can be derived or mixtures thereof, less than 15% TiO_2, and at least one deoxidizing metallic agent selected from the group consisting of Si, Mn, Al, Ti and alloys thereof.

4,017,340
SEMICONDUCTOR ELEMENT HAVING A POLYMERIC PROTECTIVE COATING AND GLASS COATING OVERLAY

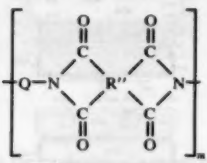
Alexander J. Yerman, Scotia, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Aug. 4, 1975, Ser. No. 601,839
Int. Cl.² H01L 23/30
U.S. Cl. 148—33.3 24 Claims

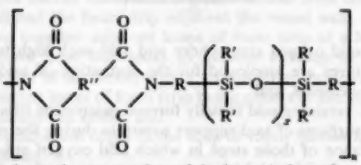
1. A semiconductor element comprising
   a body of semiconductor material having at least two regions of opposite type conductivity and a P-N junction disposed between, and formed by the abutting surfaces of, each pair of regions of opposite type conductivity;
   an end portion of at least one P-N junction exposed at a surface of the body;
   a layer of a protective coating material disposed on the exposed end portion of the at least one P-N junction,
   the protective coating material is a copolymer which is, when cured, one selected from the group consisting of the reaction product of a silicon-free organic diamine, an organic tetracarboxylic dianhydride and a polysiloxane



diamine and a blend of polyimide compound of recurring structural units of the formula:



with a polyimide composed of recurring structural units of the formula:



wherein the molar proportion of the latter is from 5 to 50 mol percent, and a suitable solvent
wherein
R is a divalent hydrocarbon radical,
R′ is a monovalent hydrocarbon radical,
R″ is a tetravalent organic radical,
Q is a divalent silicon-free organic radical which is the residue of an organic diamine,
x is a whole number equal to at least 1,
m is greater than 1, and
n is greater than 1, and
at least one layer of a chemical vapor deposited glass material disposed on the layer of protective coating material.

4,017,341
METHOD OF MANUFACTURING SEMICONDUCTOR INTEGRATED CIRCUIT WITH PREVENTION OF SUBSTRATE WARPAGE

Takaya Suzuki; Akio Mimura; Seturo Yagyu, all of Hitachi, and Shinji Okuhara, Fujisawa, all of Japan, assignors to Hitachi, Ltd., Japan

Filed Aug. 15, 1975, Ser. No. 604,947
Claims priority, application Japan, Aug. 19, 1974, 49-94183
Int. Cl.² H01L 21/20, 21/76
U.S. Cl. 148—174 8 Claims

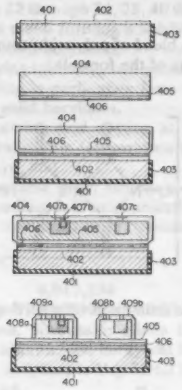
1. In a method of manufacturing a semiconductor integrated circuit wherein a plurality of monocrystalline semiconductor regions are formed in a polychrstalline semiconductor support substrate and wherein insulating material is formed between said island regions and said substrate to isolate said regions from each other and from said support substrate, and wherein circuit elements are formed in said island regions in an oxygen atmosphere at such high temperatures which would ordinarily subject said support substrate to warping resulting

from the oxidation and the introduction of oxygen into said substrate,

the improvement comprising the step of

a. preventing the warping of said support substrate resulting from the oxidation and the introduction of oxygen into said substrate during the formation of said circuit elements by

a1. initially forming a passivation film on those surfaces of said support substrate which would otherwise be exposed to said oxygen atmosphere and said such high temperatures prior to the carrying out of steps in which



said oxygen atmosphere and said such high temperatures are employed for the formation of said circuit elements, and

a2. retaining said initially formed passivation film on said surfaces of said support substrate during the performance of those steps in which said oxygen atmosphere and said such high temperatures are employed for the formation of said circuit elements, to thereby prevent the unwanted warping of said support substrate due to the oxidation and introduction of oxygen into said support during the formation of said circuit elements.

4,017,342

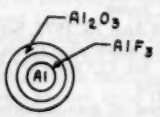
METHOD FOR IMPROVING METAL COMBUSTION IN SOLID ROCKET PROPELLANTS

Robert L. Geisler, Tehachapi, Calif.; Arnold M. Crelier, Colorado Springs, Colo., and Francisco Q. Roberto, Lancaster, Calif., assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Apr. 5, 1976, Ser. No. 674,020

Int. Cl.² C06B 45/30

U.S. Cl. 149—5 **3 Claims**



1. A method for improving the combustibility of aluminum metal powders for use in solid rocket propellant formulations which comprises the step of exposing aluminum oxide coated aluminum metal powder, having a particle size smaller than about 100 microns to hydrogen fluoride gas for a period of time sufficient to effect a reaction therebetween.

4,017,343

METHOD OF AND APPARATUS FOR ETCHING

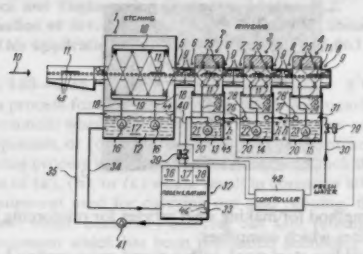
Rainer Haas, Herrenberg, Germany, assignor to Firma Hans Hollmuller, Maschinenbau, Gultstein near Herrenberg, Germany

Filed July 15, 1975, Ser. No. 596,001

Claims priority, application Germany, July 17, 1974, 2434305

Int. Cl.² C23F 1/00

U.S. Cl. 156—642 **8 Claims**



1. A method of etching a workpiece comprising the steps of:

circulating an etchant liquid in a closed etchant path over said workpiece and through an etchant sump,

thereafter circulating a rinse liquid in a closed rinse path over said workpiece and through a rinse sump,

withdrawing from said rinse sump a portion of said rinse liquid and introducing said portion into said etchant path along with a regenerator to replace lost etchant liquid and restore the strength thereof,

introducing into said rinse path a quantity of fresh water of volume substantially equal to that of said portion of rinse water withdrawn, said rinse water by circulating through a pair of such rinse paths each having a respective sump and spaced apart in a transport direction, said fresh water being added to the downstream rinse path and said portion being withdrawn from the upstream rinse path;

successively passing said workpiece in said direction through said etchant path, then through said upstream rinse path, and then through said downstream rinse path; and

automatically withdrawing from the downstream sump and introducing into the upstream sump a quantity of rinse liquid of volume substantially equal to that of said portion on withdrawal thereof from said upstream sump.

4,017,344

MAGNETICALLY ENHANCED COAXIAL CABLE WITH IMPROVED TIME DELAY CHARACTERISTICS

Harold Lorber, 3225 Burn Brae Drive, Dresher, Pa. 19025, and Irving Duboff, 1513 Woodland Road, West Chester, Pa. 18015

Division of Ser. No. 338,335, March 5, 1973, Pat. No. 3,886,506. This application May 23, 1975, Ser. No. 580,231

Int. Cl.² H01B 13/06, 13/22

U.S. Cl. 156—52 **9 Claims**

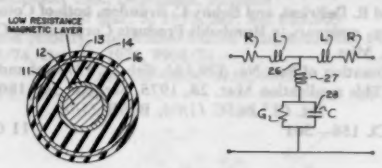
1. The method of making flexible low time delay coaxial transmission cable comprising the steps of:

forming a magnetically loaded flexible center conductor having a layer of magnetic material having high conductivity, high permeability and high anisotropy,

forming said layer of magnetic material to provide a circumferentially oriented easy axis of magnetization and a strong effective internal circumferential magnetic field,

said step of forming said layer of magnetic material comprising the steps of heating said layer of magnetic material to near its recrystallization temperature and cooling said layer of magnetic material from near its recrystallization temperature while applying a conduction current through said center conductor,

forming a flexible dielectric spacer layer around said magnetically loaded center conductor, and



forming a flexible conductive shield completely around said dielectric spacer to provide flexible magnetically enhanced transmission cable with a permanent easy axis of magnetization oriented in a circumferentially direction.

4,017,345

PROCESS FOR PRODUCING PILE FABRICS AND AN APPARATUS FOR CARRYING OUT THE PROCESS

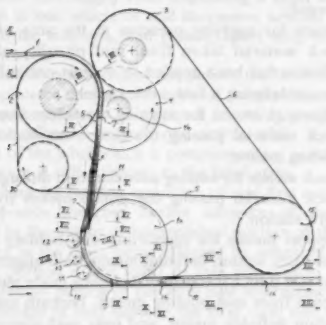
Esben Bruhn, Horning, and Finn Hansen Jensen, Skanderborg, both of Denmark, assignors to A/S Weston Toeppefabrik, Horning, Denmark

Filed Oct. 31, 1975, Ser. No. 627,862

Claims priority, application Denmark, June 4, 1975, 2497/75

Int. Cl.² B32B *31/18, 31/22*

U.S. Cl. 156—72 **17 Claims**



1. A process for producing and depositing a fibrous pile comprising the steps of providing a batt having substantially parallel edges defining a longitudinal direction of the batt and consisting of a fibrous material oriented substantially transversely of said longitudinal direction, forwarding said batt in its longitudinal direction, subdividing said batt into strips by cuts longitudinal of the batt and substantially perpendicular to the orientation of the fibres, forwarding each strip in a free path between a pair of conveying wires having line contact only with the strips, so that the fibres of the strips extend freely in both directions from the lines of contact with the conveying wires and running from a position in which they are located in positions opposite one another on either side of the subdivided batt to a position in which they are located side by side in a longitudinal plane of the subdivided batt, thereby turning each strip through an angle of 90° about its longitudinal axis, displacing the strips out of the spaces between said pairs of conveying wires by means acting on the portions of the fibres extending freely in one direction from the lines of contact with the conveying wires, and applying the portions of the fibres extending freely in the other direction from said lines of contact to a moving pile receiving surface.

4,017,346

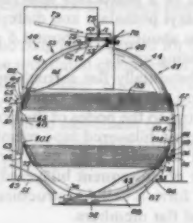
INSULATION OF VESSELS HAVING CURVED SURFACES

Hubert Stacy Smith, Bay City, Mich., assignor to The Dow Chemical Company, Midland, Mich.

Division of Ser. No. 242,061, April 7, 1972, abandoned, which is a continuation-in-part of Ser. No. 158,272, June 30, 1971. This application May 28, 1974, Ser. No. 473,985

Int. Cl.² B65H *81/00*

U.S. Cl. 156—185 **24 Claims**



1. A method for the insulation of a vessel having at least one curved wall, the steps of the method comprising

depositing a plastic foam strip and a vapor barrier material in the form of a strip about the periphery of the vessel in a plurality of loops, with the further limitation that the vapor barrier material is disposed remote from the vessel wall and the foam strip adjacent the vessel wall,

joining together adjacent loops of foam strip at a location remote from the vessel to thereby envelop at least a portion of the vessel within an insulating enclosure, the adjacent loops of foam strip being generally unconnected adjacent the vessel, and

joining adjacent edges of the strip of vapor barrier material together.

4,017,347

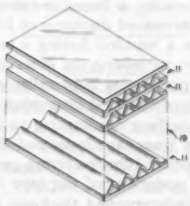
METHOD FOR PRODUCING CERAMIC CELLULAR STRUCTURE HAVING HIGH CELL DENSITY

Joseph J. Cleveland, Wysox, Pa., assignor to GTE Sylvania Incorporated, Stamford, Conn.

Division of Ser. No. 455,193, March 27, 1974, Pat. No. 3,943,994, which is a continuation-in-part of Ser. No. 313,101, Dec. 7, 1972, abandoned. This application Oct. 31, 1975, Ser. No. 627,515

Int. Cl.² F28D *17/00*; B32B *3/28*

U.S. Cl. 156—89 **5 Claims**



1. A process for producing a ceramic cellular structure comprising:

a. corrugating a green ceramic tape having a cell density of from 500 to 1600 cells per square inch of cross-sectional area and wall thicknesses from 2 to 30 mils to produce a corrugated first tape member, said tape consisting essen-

tially of finely divided sinterable solid particles of ceramic raw materials substantially uniformly distributed throughout a fugitive plastic support matrix, the weight ratio of said supporting matrix to said raw materials being from about 1 to 3 to about 1 to 6, said supporting matrix consisting essentially of from about 28.5 to 74.5 weight percent of a two part resin, the resin consisting essentially of polyvinyl butyral in the amount of from 50 to 95 weight percent, remainder an amine thermosetting resin, selected from the group consisting of melamine formaldehyde and urea formaldehyde, and from about 25 to 70 weight percent of a plasticizer selected from the group consisting of alkyl phthalate and dialkyl phthalate plasticizers and from about 0.5 to about 1.5 percent by weight of a deflocculating agent,

b. adhering a substantially flat second tape mbember containing substantially the same ceramic raw material and supporting matrix to the nodes of the first corrugated tape member to form a bilayered tape member, and

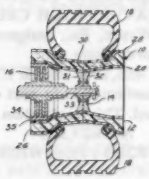
c. adhering said bilayered tape member and a predetermined number of subsequent bilayered tape members to each other to form a cellular structure having alternate corrugated and flat members.

4,017,348

METHOD OF MAKING A COMPOSITE VEHICLE WHEEL

Gerald C. Shumaker, 2685 Cevennes Terrace, Xenia, Ohio 45385

Filed Mar. 10, 1975, Ser. No. 557,000
Int. Cl.² B60B *5/02*
U.S. Cl. 156—189 **2 Claims**



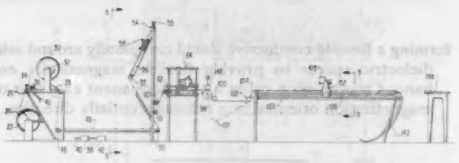
1. The method for constructing heavy duty wheels for vehicles, comprising: forming a barrel member by winding an inner layer of predetermined thickness of filament reinforced epoxy resin tape on a mandrel having a symmetrical out of round outer surface; subjecting the inner layer to a precure compaction stage; positioning a plurality of partially cured preformed segments of chopped fiber reinforced epoxy resin, having their inner surface conforming to the out of round configuration of the inner tape layer and their outer surface conforming to the desired tire receiving configuration of the wheel, around the periphery of the tape layer; winding an outer layer of a predetermined thickness of filament reinforced epoxy resin tape around the outer surface of said segments; subjecting the outer layer to precure compaction stages after each predetermined number of thicknesses of tape; curing the barrel member within a form in an autoclave at a predetermined temperature and pressure; removing the barrel member from the autoclave; allowing the barrel member to cool; securing a two part hub member within the barrel member with an epoxy adhesive.

4,017,349

APPARATUS FOR MANUFACTURING LARGE DISPOSABLE SPECIALTY DRAPES

Donald R. DePriest, and Bobby C. Brandon, both of Columbus, Miss., assignors to Humboldt Products Corporation, Columbus, Miss.

Continuation of Ser. No. 329,144, Feb. 2, 1973, abandoned.
This application Mar. 28, 1975, Ser. No. 563,180
Int. Cl.² B65C *11/00;* **B65H** *25/00*
U.S. Cl. 156—361 **11 Claims**



1. Apparatus for forming large, disposable specialty drapes having a predetermined length from a first end thereof to a substantially parallel second end thereof and having a fenestration a predetermined distance from the first end thereof, said apparatus comprising:

a. holding means for holding a plurality of rolls of stock material positioned to overlap as the stock material is withdrawn therefrom;

b. adhesive supply means for applying adhesive to the area of overlap of stock material taken from at least one roll thereof;

c. means for applying pressure to the area of overlap of stock material taken from said plurality of rolls after adhesive has been applied to at least one roll thereof;

d. means defining a first work station;

e. alignment means for aligning a reinforcement patch on stock material passing the first work station from the holding means;

f. punch means for cutting a fenestration through reinforced stock material passing the punch means from the first work station;

g. support means for supporting said holding means, said first work station defining means, said alignment means, and said punch means and including guide means defining a path from said holding means, beneath said first work station defining means, and over said alignment means, permitting an operator positioned at the first work station access to said alignment means, said guide means being adjustable to permit adjustment of the length of the path to accommodate large disposable specialty drapes having various predetermined lengths and predetermined distances;

h. knife means for cutting large, disposable specialty drapes from fenestrated stock material, said knife means separated from said punch means by a distance along the path equal to the predetermined distance plus an integral multiple of the predetermined length;

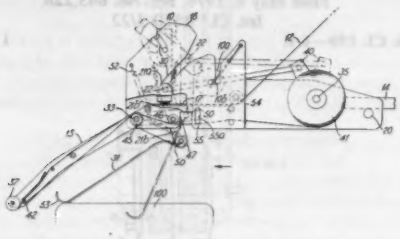
i. drive means for moving stock material along the path from a supply thereof at said holding means; and

j. control means for intermittently deactivating said drive means and said adhesive supply means and activating said punch means and said knife means, said control means including linear measuring means for measuring the length of stock material moving on the path and a control unit responsive to measurement by said linear measuring means of the present length of stock material for deactivating said drive means and activating said punch means and said knife means.

4,017,350
LABELLING MACHINE

James Ernest Thomas, Dagenham, England, assignor to Pricemaster Ltd., Degenham, England

Filed Mar. 5, 1975, Ser. No. 555,905
Claims priority, application United Kingdom, June 14, 1974, 26499/74, Oct. 30, 1974, 9908/74
Int. Cl.² B65C 9/18, 9/42
U.S. Cl. 156—384 14 Claims



1. A labelling machine for repetitive cycle operation having a strip to which is affixed pressure-sensitive adhesive labels spaced apart at a constant pitch therealong for applying a label to successive articles moving past the machine, comprising:

a mounting;

a supply reel supporting the label strip and a wind up reel for collecting the spent strip, said reels being supported for rotation on parallel axes on said mounting;

drive means for said wind up reel;

a label applicator carried on said mounting and disposed in the path of the moving articles and receiving the label strip from said supply reel, dispensing a label from the strip on to one article of said successive articles in each cycle of the machine, and passing spent strip on to the wind up reel;

first means for causing initial advance of the label strip past said applicator during each cycle of the machine so as to cause said applicator to dispense a leading portion of a label for adhesion to said one article while a residual portion of the label which is complementary to said leading portion is still adhering to the label strip;

second means for limiting operation of said first means and said advance thereby, further advance of the strip, namely to the extent of said residual portion of the label adhering to the strip, being effected by adhesion of said leading portion of the label to said one article and by consequential pulling of the strip past said applicator by said adhesion of said label to the strip until said label is fully detached from the strip;

said label applicator being coupled with said drive means and being motivated by and deriving movement from said one article thereby causing said drive means to drive said wind up reel and bring a label on said strip adjacent to said applicator without advancing said leading portion of the label past said applicator; and,

a drawing off arm carried on said mounting motivated by and deriving movement from said one article and causing said first means to cause said initial advance of the label strip and dispensing of said leading portion of the label while the wind up reel is stationary.

4,017,351
SYSTEM AND DEVICE FOR INFLATING AND SEALING AIR INFLATED CUSHIONING MATERIAL

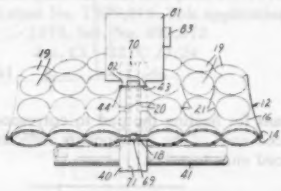
Curtis L. Larson, Hudson, Wis., and John R. Ward, St. Paul, Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Dec. 24, 1975, Ser. No. 644,047
Int. Cl.² B32B 31/00
U.S. Cl. 156—494 14 Claims

1. A device adapted for inflating and sealing a strip material comprising two thin elongate flexible films, each film comprising a heat sealable thermoplastic material forming at least one surface of the film, said films being positioned with their thermoplastic surfaces adjacent and with adjacent portions of their thermoplastic surfaces in face-to-face contact and being fused together in discrete areas to define a plurality of unsealed adjacent surface areas in a pattern providing two rows of inflatable chambers and a passageway between the rows extending the length of the strip, with each of said chambers having an inlet opening communicating with the passageway, wherein said device comprises:

means adapted to defining a strip path for a said strip material through said device extending from a inlet to an outlet end;

means along said strip path adapted for defining an inflation station for the uninflated chambers of a said strip material comprising an elongate nozzle having a terminal end portion directed toward the inlet end of said path and positioned to afford movement of the portion of the strip material along said strip path over said nozzle with said nozzle in its passageway;



means spaced from the terminal end of said nozzle toward the outlet end of said strip path adapted for opening one of the films of a said strip material along its passageway to afford movement of the strip material along said strip path;

means along the strip path subsequent to the inflation station adapted for applying heat to seal the inlet openings of a said strip material along predetermined sealing paths longitudinally of the strip material;

tensioning means adapted for tensioning a said strip material along the strip path through said means for applying heat, said tensioning means being adapted to remove wrinkles across the inlet openings;

means along said strip path adapted for pressing together the films of a said strip material along the sealing paths and in areas on the sides of the sealing paths adjacent the rows of chambers from a first position in advance of said means for applying heat to a second position between said means for applying heat and the outlet end of said strip path; and

means adapted for affording cooling of sealed inlet openings on a said strip material between said means for applying heat and said second position.

4,017,352
APPARATUS USED IN THE APPLICATION OF WHITE SIDEWALL TO A TIRE

Frederick F. Vannan, Jr., Akron, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed May 26, 1976, Ser. No. 690,114
Int. Cl.² B29C 27/00; B29H 7/00
U.S. Cl. 156—502 9 Claims

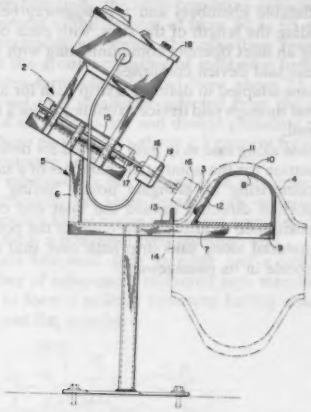
1. An apparatus for treating abutted, spliced ends of a component of an unvulcanized tire, comprising:

a. means for supporting spliced ends of an unvulcanized component in spliced, abutting engagement;

b. a movable pad disposed in spaced relation from the support means, said pad including a number of rigid, movable segments composed of heat conductive material

and means for allowing the segments to conform to the contour of the spliced ends;

c. means for reciprocating the pad to and from the support means, whereby the spliced ends of the component are compressed between the support means and pad; and



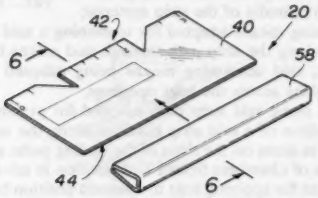
d. means for heating the pad to correspondingly heat the spliced ends of the components sufficiently to bond the spliced ends together.

4,017,353

ACCESSORY TOOL FOR BURGLAR ALARM FOIL

Morton Cohen, 41-27 Westmorland St., Little Neck, N.Y. 11363

Filed Feb. 9, 1976, Ser. No. 656,291
Int. Cl.² B44C 7/00; A47L 13/02
U.S. Cl. 156—574 **6 Claims**



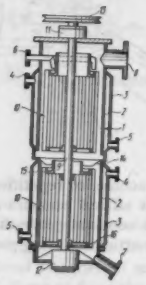
1. A tool for facilitating the adhesive attachment on a window or like support surface of self-adhesive burglar alarm foil in a crossover contemplating a 90° change of direction, said tool comprising a generally rectangular body having opposite foil-positioning and distal sides, a triangular cutout in said foil-positioning side presenting an aligning edge which is perpendicular to the foil-positioning side has been inserted, and an angularly oriented changing-direction edge both of which bound said triangular cutout, the angle between the aligning edge and the changing-direction edge is 45° said tool having an operative position established by the alignment of said tool aligning edge with an edge of said foil adhesively attached in a first direction along said window in which said tool is then in a superposed position over said foil in folded back relation on itself exposing said foil adhesive surface, said foil being adapted to be folded again upon itself but along said changing-direction edge of said tool both to orient said foil in a second transverse direction and to reestablish the facing relation of said foil adhesive surface to said window, and a grip along said distal edge for removing said tool from beneath said foil adhesive surface, whereby there may be continued adhesive attachment of said foil to said window in said changed transverse direction.

4,017,354

ROTARY FILM EVAPORATING APPARATUS

Alexandr Nikolaevich Marchenko, Kolodezny pereulok, 47, kv. 2, and Anatoly Borisovich Tjutjunnikov, ulitsa Frunze, 17, kv. 34, both of Kharkov, U.S.S.R.

Filed May 4, 1976, Ser. No. 683,228
Int. Cl.² B01D 1/22
U.S. Cl. 159—6 R **1 Claim**



1. A rotary film evaporating apparatus comprising: a vertical cylindrical housing subdivided vertically into a plurality of intercommunicating sections; a heating jacket on the side wall of said housing at each said section; a central shaft mounted for rotation within said housing; hollow spraying drums concentrically mounted on said shaft in each one of said sections; longitudinal bars defining the side wall of each said spraying drum, said bars being generally S-shaped in cross-section and arranged so that the longitudinal outer edges of said bars extend into the indented portions of the adjacent ones of said bars, defining therewith labyrinth-like passsages for a vapor; the portions of said bars which are the most remote from said shaft having apertures made therethrough for passage of a liquid; means for supplying a liquid product to be evaporated into the topmost portion of said housing; means for withdrawing a concentrate from the bottom part of said housing; means for withdrawing the vapor from the internal space of said housing; means for collecting the evaporating liquid flowing down the wall of said housing within an upper one of said sections and for directing it into said spraying drum of the underlying one of said sections, said last-mentioned means being located intermediate the adjacent pairs of said sections.

4,017,355

PROCESS FOR TREATING LATICES

Takashi Kiyota; Yoshihiko Araki, both of Yokohama, and Hideo Hayashi, Kawasaki, all of Japan, assignors to Nippon Oil Company Ltd., Tokyo, Japan

Continuation-in-part of Ser. No. 513,522, Oct. 10, 1974, abandoned, which is a continuation of Ser. No. 207,799, Dec. 14, 1971, abandoned. This application May 3, 1976, Ser. No. 682,853
Claims priority, application Japan, Dec. 18, 1970, 45-113029
Int. Cl.² B01D 1/22
U.S. Cl. 159—49 **7 Claims**

1. A process for removing unreacted monomers or solvents from a latex selected from the group consisting of synthetic rubber latex and synthetic resin latex which comprises bringing said latex into contact with an inert gas fluid, without imposition of any substantial mechanical shear stress, at a temperature ranging from 20° to 100° C by feeding said latex into the upper part of an wetted-wall tower (falling film evaporator), said wetted-wall tower being provided with one or a

plurality of circular tubes opened at the both ends and standing vertically, the latex being supplied at the upper end of the tube so as to contact with tube walls, the feed rate of latex being the range of from 5 to 100 gm/min/cm perimeter, the

latex fed being caused to flow down spontaneously by gravity along tube walls in the state of film, the average thickness of said film being in the range of from 0.2 to 1.2 mm and an inert gas being introduced into said tubes at the lower or upper part of said tubes.

4,017,356

APPARATUS AND METHOD FOR MANUFACTURING WOOD PULP BY GRINDING WOOD BLOCK MATERIAL

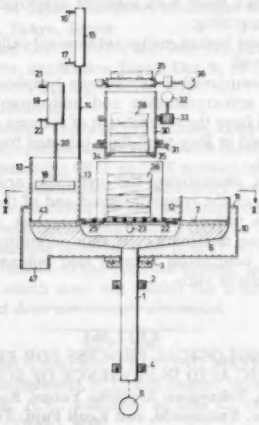
Hjalmar Sten Ingemar Bystedt, Danderyd, Sweden, assignor to Defibrator AB, Stockholm, Sweden

Continuation-in-part of Ser. No. 470,782, May 17, 1974, abandoned. This application Mar. 22, 1976, Ser. No. 669,308

Claims priority, application Sweden, May 22, 1973, 072100/73

Int. Cl.² B02C *23/18, 7/12;* **D21B** *1/16, 1/26*

U.S. Cl. 162—26 **7 Claims**



6. A method for manufacturing ground wood pulp from ligno-cellulose containing block material by separating the fibers therein by grinding the block material against a rotating grinding disc end surface comprising providing projecting means in the shape of elevations on the disc end surface to define grooves directed toward the end surface periphery, pressing each piece of block material along a longitudinal side against the disc end surface with its fibers directed outwardly from the center of the grinding disc toward the disc periphery while the fibers are separated to orient the fibers in the same direction as the edges of the elevations and carrying the fibers radially outward so that the elevation edges engage the block fibers under a movement component transverse to the longitudinal direction of the fibers.

4,017,357

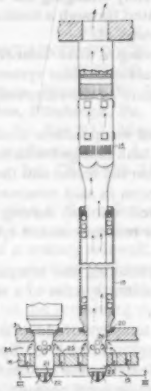
NUCLEAR CORE INLET FLOW ARRANGEMENT

John F. Patterson, Jr., Murrysville, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Continuation of Ser. No. 262,434, June 13, 1972, now Defensive Publication No. T909,019. This application July 31, 1974, Ser. No. 493,372

Int. Cl.² G21C *15/24*

U.S. Cl. 176—61 **2 Claims**



1. A nuclear core inlet flow arrangement for a nuclear reactor, said nuclear core comprising, in combination, a plurality of fuel assemblies including fissile material for generating heat by nuclear fission, inlet flow means for admitting reactor coolant into said nuclear core, said reactor coolant serving to remove said generated heat from said nuclear core, said inlet flow means comprising a plurality of seperate plenum flow regions, plurality of inlet flow nozzles respectively communicating with a corresponding one of said plurality of fuel assemblies for admitting and directing said reactor coolant into and through said corresponding fuel assemblies, each of said inlet flow nozzles having a plurality of parallel inlet flow path means with the respective corresponding flow path means of said plurality of nozzles in fluid communication with a corresponding one of a plurality of separate plenum flow regions from which said reactor coolant is drawn into said nuclear core for assuring the existence of an inlet flow path for said reactor coolant into said nuclear core, said plurality of parallel inlet flow path means associated with each of said nozzles being connected by a common flow channel comprising the interior of said corresponding inlet flow nozzle and an outlet means for exiting said reactor coolant from said nuclear core.

4,017,358

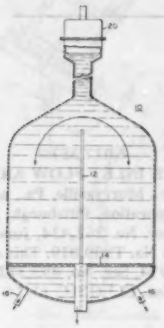
BORON THERMAL REGENERATION SYSTEM

Martinus R. Van der Schoot, Dilbeek, Belgium, assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Continuation of Ser. No. 359,054, May 10, 1973, abandoned, which is a continuation-in-part of Ser. No. 189,321, Oct. 14, 1971, abandoned. This application June 26, 1975, Ser. No. 591,781

Int. Cl.² G21C *15/08*

U.S. Cl. 176—65 **3 Claims**



1. A process for reversibly changing the boric acid concentration in coolant circulated through a nuclear reactor coolant system comprising the steps of:

removing coolant having a first concentration of boron therein from the reactor coolant system;

reducing the temperature of the removed coolant to a first lower level;

conveying the reduced temperature coolant in a forward direction through a tank charged with ion exchange resins to remove boron from the resins and thereby increase the concentration of boron in said removed coolant;

returning said removed coolant having increased boron concentration to the reactor coolant system; and thereafter;

again removing and reducing the temperature of coolant from the reactor coolant system to a second level lower than said first level;

conveying the second temperature level coolant in a reverse flow direction through said tank to deposit boron on said resins and thereby decrease the concentration of boron in the second temperature level coolant; and

returning said second temperature level coolant having a decreased concentration of boron therein to the reactor coolant system;

continuing the circulation of said reduced temperature coolant and the second temperature level coolant respectively through the tank until an equilibrium is established between the concentration of boron and the temperature of said coolants.

4,017,359

PRODUCTION OF NON-ANTIGENIC ATTENUATED VIRUSES

Otto-Christian Straub, Tuebingen, Germany, assignor to Bayer Aktiengesellschaft, Leverkusen, Germany

Division of Ser. No. 313,245, Dec. 8, 1972, abandoned. This application June 24, 1974, Ser. No. 482,619

Claims priority, application Germany, Dec. 10, 1971, 2161344

Int. Cl.² C12K *9/00*; A61K *45/02*

U.S. Cl. 195—1.3 **4 Claims**

1. A method of producing an attenuated virus capable of stimulating the natural defense mechanism of a host organism with a detectable non-specific induction of interferon without antigenic effect which comprises passing a virus through a plurality of at least 300 tissue cultures to achieve a degree of attenuation such that antigenic effect cannot be detected in the presence of a detectable non-specific induction of interferon in said organism, wherein said virus is AUJESZKY/pseudo-rabies virus, Influenza virus A1, Influenza virus A1—strain FM1, AUJESZKY/pseudo-rabies virus—strain S/T, or IPV virus.

4,017,360

METHOD FOR PURIFYING HEPATITIS B ANTIGEN

Alexander U. Bertland; Alfred A. Tytell, both of Lansdale; George P. Lampson, Hatfield, and Eugene Buynak, North Wales, all of Pa., assignors to Merck & Co., Inc., Rahway, N.J.

Filed May 14, 1975, Ser. No. 577,483

Int. Cl.² A61K *39/12*; C12K *5/00*, *7/00*

U.S. Cl. 195—1.4 **7 Claims**

1. A method for purifying hepatitis B antigen from a partially purified concentrate obtained from clarified plasma containing hepatitis B antigen comprising treating the concentrate with a quantity of pepsin effective to digest proteinaceous matter at a pH within the range wherein pepsin is enzymatically active, treating the concentrate with a quantity of urea effective to dissociate proteinaceous matter, and removing pepsin, pepsin degradation products and urea, and optionally adding formaldehyde in a concentration effective to inactivate viruses.

4,017,361

PROCESS FOR OBTAINING CONTINUOUS LINES OF TUMORAL CELLS IN VITRO

Henri Lucien Febvre, Paris, France, assignor to Choay S.A., Paris, France

Filed Mar. 20, 1975, Ser. No. 560,241

Claims priority, application France, Mar. 27, 1974, 74.10458

Int. Cl.² C12B *3/00*; C12K *9/00*

U.S. Cl. 195—1.8 **9 Claims**

1. Process for obtaining continuous lines of human tumoral cells in vitro, originating from surgical samples of malignant tumors in which there is an inherent cytotoxicity of the lymphocytes, comprising:

culturing said human malignant tumoral cells in vitro in the presence of

an immunosuppressive anti-human lymphocyte serum devoid of anti-erythrocyte and anti-thrombocyte action, obtained from the supernatant of cultures of lymphocytes established in long-term lines initiated from human lymphocytes,

said serum neutralizing the cytocidic and macrophagic activities of the lymphoblastoid and of the active monocyte cells present in the cellular system, with respect to said human malignant cells, thus permitting the establishment of continuous lines of said human malignant tumoral cells in vitro.

4,017,362

MICROBIOLOGICAL PROCESS FOR PREPARING L-TARTARIC ACID IN PRESENCE OF SURFACTANTS

Yuichi Miura, Tokuyama; Kiyohiko Yutani, Kudamatsu; Hitoshi Takesue, Yamaguchi, and Kenji Fujii, Tokuyama, all of Japan, assignors to Tokuyama Soda Kabushiki Kaisha, Japan

Filed Feb. 5, 1976, Ser. No. 655,411

Int. Cl.² C12D *1/02*

U.S. Cl. 195—30 **15 Claims**

1. A method for preparing L-tartaric acid which comprises reacting cells of a microorganism belonging to the genus Nocardia having the ability to produce an enzyme which hydrolyzes the epoxy ring of cis-epoxysuccinic acid or crude cisepoxysuccinate hydrolase derived from said microorganism

with cisepoxysuccinate acid or a derivative thereof having the cis-epoxysuccinate acid structure in an aqueous medium containing at least one surfactant, and thereafter recovering L-tartaric acid from said aqueous medium.

4,017,363

PRODUCTION OF HIGH PURITY GLUCOSE SYRUPS

William H. McMullen, Norwalk, Conn., and Rosemary Andino, Brooklyn, N.Y., assignors to Novo Industri A/S, Bagsvaerd, Denmark

Filed Dec. 19, 1975, Ser. No. 642,474
Int. Cl.² C12D 13/02
U.S. Cl. 195—31 R 4 Claims

1. A process for converting starch into a glucose syrup containing at least 98% glucose on a dry solids basis comprising:

a. enzymatically liquefying a starch slurry to produce thereby a dextrin solution;

b. saccharifying the resulting dextrin solution at a 10–20% w/w dsb solids content enzymatically for from about 15–75 hours with amyloglucosidase at an enzyme dosage of 0.30–1.0 AG units per gram of starch solids;

c. halting the saccharification when the glucose content exceeds 98% on a dry solids basis.

4,017,364

PROCESS FOR PRODUCING AN ENZYME PRODUCT HAVING VARIABLE SOLUBILITY

Ekkehard van Leemputten, Clarens, Switzerland, assignor to Societe d'Assistance Technique pour Produits Nestle S.A., Lausanne, Switzerland

Filed June 19, 1975, Ser. No. 588,182
Int. Cl.² C07G 7/02
U.S. Cl. 195—68 11 Claims

1. A process for the preparation of an enzymatically active product having a variable solubility in an aqueous medium dependent on pH, comprising reacting an enzyme with a polymer carrying both free aldehyde groups and free acid groups, said free acid groups being present in a sufficient number to ensure the variable solubility of the product.

4,017,365

METHOD FOR DETERMINING ENZYME ACTIVITY

Toshimasa Nakayama, Kawasaki, and Motoshi Kitamura, Tokyo, both of Japan, assignors to Chugai Seiyaku Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 7, 1974, Ser. No. 512,620
Claims priority, application Japan, Oct. 9, 1973, 48-112846
Int. Cl.² G01N 31/14
U.S. Cl. 195—103.5 R 4 Claims

1. In the Karmen method, comprising coupling GOT or GPT with dehydrogenase which reacts with substrates of GOT or GPT are determining GOT or GPT activity by determining the reduction in absorbance in ultraviolet wave length of $NADH_2$ which is coenzyme of the dehydrogenase,

the improvement comprising using a GOT or GPT-containing serum sample of about 0.04 to 0.01 ml and adding a nonion surfactant to the reaction system, said surfactant being one which does not inhibit the intended enzyme activity and does not absorb ultraviolet.

4,017,366

THERMOGRAPHIC PRINTING METHOD

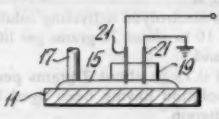
Paul Y. Hsieh, Ridgewood, N.J., and Eugene W. Rogall, Huntington Station, N.Y., assignors to Ing. C. Olivetti & C., S.p.A., Ivrea (Turin), Italy

Continuation of Ser. No. 454,653, March 25, 1974, which is a continuation of Ser. No. 323,583, Jan. 15, 1973, abandoned, which is a continuation of Ser. No. 64,395, Aug. 17, 1970, abandoned. This application Feb. 6, 1976, Ser. No. 655,795
Int. Cl.² G01D 15/06, 15/10
U.S. Cl. 204—2 2 Claims

1. A method of producing visible printing on an electrically insulating receiving medium comprising the steps of:

applying to a selected portion of said receiving medium a non-conductive heat sensitive material in the liquid state and of the type that changes its color when heated over a threshold temperature in mixture with a liquid electrolyte chemically non-reactable with said heat sensitive material;

contacting said selected portion of said applied mixture with a pair of closely spaced electrodes made of material electrolytically non-corrodable by said liquid electrolyte, and



applying an electrical potential difference across said electrodes for causing a current to flow therebetween and through said applied mixture to heat a selected portion of said applied mixture to a temperature higher than said threshold temperature to effect the associated heat sensitive material to change color.

4,017,367

IRONING CONTAINER STOCK MANUFACTURING METHOD

William T. Saunders, Weirton, W. Va., assignor to National Steel Corporation, Pittsburgh, Pa.

Division of Ser. No. 561,832, March 25, 1975, Pat. No. 3,956,915. This application Apr. 1, 1976, Ser. No. 672,711
Int. Cl.² B21B 27/02
U.S. Cl. 204—28 1 Claim

1. In the production of flat rolled steel for use in manufacture of a drawn and ironed cup-shaped container body having a bottom wall and a unitary sidewall,

a continuous-strip method for improving lubricant adhesion to one surface of such strip material and decreasing surface contact on the remaining surface during subsequent drawing and ironing operations, comprising the steps of

providing flat rolled steel in continuousstrip form,

processing such continuous-strip to selected gage by cold rolling in continuous-strip mill means including performing final cold reducing operations to impart a selected surface texture, such final cold reducing operations including the steps of

providing roll stand means with surface contact rolls of preselected embossed finishes,

passing the continuous-strip through such roll stand means to impart a pattern of surface indentations on such continuous-strip surfaces,

such surface indentations including linearly extended impressions providing a textured surface for holding lubricant on that surface of the continuous-strip to be exposed to ironing rings working on an exterior surface of a cup drawn from such continuous-strip,

with the remaining surface of the continuous-strip flat rolled steel being treated simultaneously during passage through such roll stand means to imprint surface indentations including linearly extended impressions for decreasing intimate surface contact between an ironing mandrel and such remaining surface during ironing operation on such cup,

and, then

electroplating such flat rolled steel with a protective metal coating applied subsequent to such final cold reduction operations,

such electroplating being applied uniformly and not reflowed in order to maintain such surface indentations.

4,017,368

PROCESS FOR ELECTROPLATING ZIRCONIUM ALLOYS

Daniel E. Wax, and Robert L. Cowan, II, both of Livermore, Calif., assignors to General Electric Company, San Jose, Calif.

Filed Nov. 11, 1974, Ser. No. 522,767
Int. Cl.² C25D 5/34
U.S. Cl. 204—32 R 8 Claims

1. An aqueous electrolytic activating solution comprised of
a. from about 10 to about 20 grams per liter of ammonium bifluoride, and
b. from about 0.75 to about 2 grams per liter of sulfuric acid, said solution having been aged by immersion of zirconium therein.

4. A method for protecting zirconium and zirconium base alloys by electrolytic deposition of a metal film thereon, comprising
a. activating the zirconium and zirconium alloys in an aqueous electrolytic activating solution of from about 10 to about 20 grams per liter of ammonium bi-fluoride and from about 0.75 to about 2 grams per liter of sulfuric acid, said solution being aged by immersion of pickled zirconium in said solution for about 10 minutes, and
b. electroplating the zirconium material in a plating bath of the metal to be plated on the zirconium material.

4,017,369

METHOD FOR THE ELECTROLYTIC RECOVERY OF SB, AS, HG AND/OR SN

Nils Folke Rune Lindström, Skelleftehamn, Sweden, assignor to Boliden Aktiebolag, Stockholm, Sweden

Filed May 3, 1976, Ser. No. 682,337
Claims priority, application Sweden, May 7, 1975, 7505336
Int. Cl.² C25C 1/14, 1/16, 1/22
U.S. Cl. 204—121 5 Claims

1. A method for selectively leaching at least one element from the group comprising antimony, mercury, arsenic and tin from sulphidic and oxidic materials with alkali sulphide solutions with subsequent electrolytic recovery of the leached elements, comprising maintaining in the electrolyte a concentration of sulphide ions and hydroxyl ions, so that the sum of the sulphide ion concentration in mol/l multiplied by two and the hydroxyl ion concentration in mol/l is at least 8, the electrolyte containing hydroxyl ions at least in a quantity equimolar to the sulphide ions, and effecting the electrolysis at an anode current density of more than 1500 A/m².

4,017,370

METHOD FOR PREVENTION OF FOULING BY MARINE GROWTH AND CORROSION UTILIZING TECHNETIUM-99

Carl B. Wootten, Rte. 1, Box 249A, Kaswick, Va. 22947

Filed May 28, 1974, Ser. No. 473,691
Int. Cl.² C23F 13/00; C25D 3/54; B63B 59/00
U.S. Cl. 204—147 6 Claims

1. A method for the prevention of fouling and corrosion on the surfaces of underwater instrumentation and buoys which are exposed to marine environments which comprises treating said surfaces with technetium-99, prior to exposure of said surfaces to a marine environment, in an amount effective to prevent the growth of marine organisms on said surfaces and simultaneously effective to inhibit corrosion of said surfaces and exposing said treated surfaces to a marine environment.

4,017,371

SOLID RADIATION CURABLE POLYENE COMPOSITIONS CONTAINING LIQUID POLYTHIOLS AND SOLID STYRENE-ALLYL COPOLYMER BASED POLYENES

Charles R. Morgan, Silver Spring, Md., assignor to W. R. Grace & Co., New York, N.Y.

Division of Ser. No. 330,818, Feb. 8, 1973, Pat. No. 3,925,320, which is a continuation-in-part of Ser. No. 250,554, May 5, 1972, abandoned. This application Nov. 24, 1975, Ser. No. 634,721
Int. Cl.² C08F 8/18, 8/34
U.S. Cl. 204—159.18 10 Claims

1. A solid curable composition useful for obtaining a solid crosslinked polythioether consisting essentially of:
1. a solid polyene which is the reaction product of a styrene-allyl alcohol copolymer and a member selected from the group consisting of at least one reactive unsaturated monoisocyanate and at least one reactive unsaturated monocarboxylic acid, said polyene containing at least 2 reactive carbon to carbon bonds per molecule;
2. a liquid polythiol containing at least 2 thiol groups per molecule, the total combined functionality of (a) the reactive unsaturated carbon to carbon bonds per molecule in the polyene and (b) the thiol groups per molecule in the polythiol being greater than 4; and
3. a photocuring rate accelerator.

4,017,372

PROCESS FOR ELECTRODEPOSITION OF CROSS-LINKED POLYMER COATINGS

Earl H. Wagener, Concord, Calif.; Ritchie A. Wessling, and Dale S. Gibbs, both of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Filed Apr. 21, 1975, Ser. No. 569,722
Int. Cl.² C25D 13/06
U.S. Cl. 204—181 10 Claims

1. A method for applying a cross-linked coating to an object having an electroconductive surface comprising the steps of
1. immersing the object in a coating bath comprising a latex of cationic structured particles of a film-forming polymer consisting of a nonionic, organic polymer core encapsulated by a thin layer of a water-insoluble, organic polymer having pH independent cationic groups chemically bound to the organic polymer at or near the particle surface;
2. passing an electric current through said coating bath sufficient to deposit and to cross-link a coating of said structured particles of polymer on the object by providing a difference of electrical potential between the object and an electrode that is
a. spaced apart from said object
b. in electrical contact with said coating bath; and
c. electrically positive in relation to said object;

said coating bath having a conductivity of from about 300 micromhos to about 3500 micromhos per centimeter measured at 25° C.

4,017,373

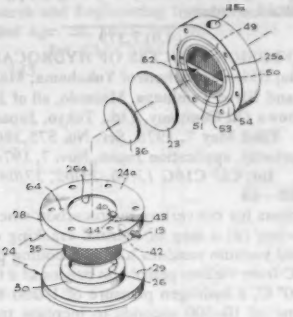
ELECTROCHEMICAL SENSING CELL

Manuel Shaw, Bel Air, and Imbrie Thatcher, Chatsworth, both of Calif., assignors to Interscan Corporation, Chatsworth, Calif.

Filed Apr. 5, 1976, Ser. No. 673,963
Int. Cl.² G01N 27/46
U.S. Cl. 204—195 R 12 Claims

1. An electrochemical sensing cell of the type having a counterelectrode, a sensing electrode and an electrolyte, and used for detecting a gas species in a fluid sample, said cell comprising:
a rigid manifold cap having a lower surface, a shallow recess in said lower surface, and spaced inlet and outlet ports communicating to said recess for flowing said fluid sample through said recess,
said sensing electrode being substantially planar,
a container housing said counterelectrode and said electrolyte, and

a cover for said container, said cover having an upper surface on which said planar sensing electrode is situated, said cover having an opening through which electrolyte from said container can contact said sensing electrode, said manifold cap being secured to said cover so that said



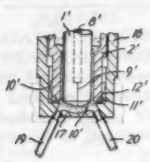
sensing electrode is clamped between said cap and said cover, so that said fluid sample flowing through said recess is in contact with one side of said sensing electrode over the entire area of said recess, and so that said electrolyte is in contact with the other side of said sensing electrode over the entire area of said opening.

4,017,374

ELECTROCHEMICAL MEASURING ELECTRODE

Flemming Aas, Soborg, and Ole Dollerup Jensen, Herlev, both of Denmark, assignors to Radiometer A/S, Copenhagen, Denmark

Filed Sept. 23, 1974, Ser. No. 508,623
Int. Cl.² G01N 27/30, 27/46
U.S. Cl. 204—195 P **1 Claim**



1. An arrangement for carrying out electrochemical measurements on samples, comprising

a measuring chamber having walls surrounding a measuring cavity, inlet and outlet means for introducing the samples into and expelling them from the measuring cavity, and a hole in the walls leading to the measuring cavity, in combination with

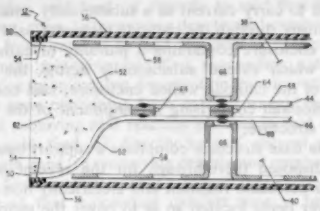
an electrochemical measuring electrode including a substantially cylindrical portion, a thin foil-shaped membrane arranged over an end face of the cylindrical portion and folded along the adjacent cylindrical outer wall of the cylindrical portion, a resilient O-ring inserted over the folded-over part of the membrane and a circumferential groove in the cylindrical portion at the transition from the cylindrical outer wall to the end face thereof, the groove being of such dimension in relation to the O-ring and so positioned that the O-ring, when seated in the groove, will be maintained therein by its elastic force and extends beyond the end face of the cylindrical portion, whereby, when the electrode is placed so in relation to the measuring chamber that the membrane covers the hole in the walls of the measuring chamber, the O-ring will in addition to maintaining the membrane in position on the cylindrical portion, provide a sealing of the membrane against the walls of the measuring chamber.

4,017,375

BIPOLAR ELECTRODE FOR AN ELECTROLYTIC CELL

Gerald R. Pohto, Mentor, Ohio, assignor to Diamond Shamrock Corporation, Cleveland, Ohio

Filed Dec. 15, 1975, Ser. No. 640,647
Int. Cl.² C25B 9/00
U.S. Cl. 204—255 **11 Claims**



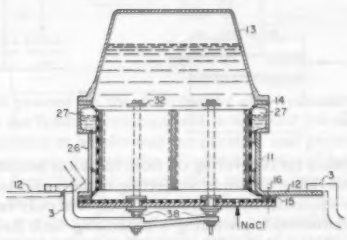
1. A bipolar electrode comprising: two pans of identical configurations; an electrode plate connected to each of said pans such that said pans separate said electrode plates; means for connecting said pans in back-to-back spaced relation to provide electrical and mechanical contact therebetween; said pans presenting a peripheral channel when connected; and at least one access port for adding materials or removing products from the bipolar electrode.

4,017,376

ELECTROLYTIC CELL

Luciano Mosé, Dortmund-Hoechsten; Wolfgang Kramer, Herdecke; Wolfgang Strewe, Dortmund, and Bernd Strasser, Hamm, all of Germany, assignors to Hooker Chemicals & Plastics Corporation, Niagara Falls, N.Y.

Filed Jan. 20, 1975, Ser. No. 542,537
Claims priority, application Germany, Oct. 2, 1974, 2448187
Int. Cl.² C25B 1/24, 9/02, 9/04
U.S. Cl. 204—258 **29 Claims**



1. An electrolytic cell of the vertical electrode type including a top and bottom, which cell comprises at least one anode and at least one cathode, a rectangular cathode walled enclosure, a cathode busbar structure, cathode elements having a box-like structure, anode busbars and an anode base structure including a bottom, wherein:

said cathode wall enclosure comprises four walls with the aspect ratio of the sidewalls to the end walls being at least 2:1, one sidewall of the walled enclosure being fabricated from a conductive metal, the conductive metal sidewall having at least one cathode lead-out busbar, said cathode walled enclosure containing a plurality of cathode elements and a peripheral chamber for conducting gases on the upper part of the cathode walled enclosure;

said cathode busbar structure comprises said conductive metal sidewall and said cathode lead-out busbar;

said cathode elements comprise metal means for composite functions of structural supporting and for electrical conducting, said box-like structure comprising two parallel foraminous plates with their upper ends and lower ends bent, thereby forming a box which is open on both sides after assembly;

said metal means comprise spacer pieces attached to the foraminous plates to provide a uniform nominal distance between the foraminous plates, thereby providing gas compartment space inside the cathode box structure allowing for vertical flow of fluids within said cathode box, the metal means being in electrical contact with the interior of said conductive metal sidewall and being adapted to carry current at a substantially uniform current density through the cathode elements, said cathode walled enclosure containing a plurality of cathode elements which extend substantially across the interior length of the cathode walled enclosure, said conductive metal sidewall comprising a component of the cathode busbar structure;

said anode base structure comprises a support base having holes disposed therethrough for the receipt of anode posts, a corrosion resistant and electrically non-conductive layer being located so as to cover the support base and having holes disposed therethrough corresponding to the holes in the support base, said anode posts being in electrical communication with said anode busbars by means of electrical contacts.

4,017,377

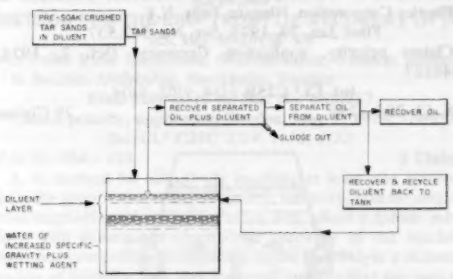
PROCESS AND FLUID MEDIA FOR TREATMENT OF TAR SANDS TO RECOVER OIL

John B. Fairbanks, Jr., 3927 S. 3030 East, Salt Lake City, Utah 84106, and Gary C. Brimhall, 2915 Branch Drive, Salt Lake City, Utah 84117

Continuation-in-part of Ser. No. 462,206, April 19, 1974, abandoned. This application Sept. 18, 1975, Ser. No. 614,612

Int. Cl.² C10G *1/04*

U.S. Cl. 208—11 LE **8 Claims**


PRE-SOAK CRUSHED TAR SANDS IN DILUENT
TAR SANDS
RECOVER SEPARATED OIL PLUS DILUENT
SEPARATE OIL FROM DILUENT
RECOVER OIL
SLUDGE OUT
RECOVER & RECYCLE DILUENT BACK TO TANK
DILUENT LAYER
WATER OF INCREASED SPECIFIC GRAVITY PLUS WETTING AGENT

1. A process for recovering oil from tar sands including the steps of: providing tar sands; subjecting initially said tar sands to a non-aqueous, hydrocarbon, tar-oil viscosity-reducing diluent environment; providing a separating tank having an aqueous bath of ambient temperature condition not exceeding 100° F. and with a specific gravity greater than one but not exceeding 1.01, said aqueous bath including a wetting agent; directly introducing, for settling, said tar sands, containing diluent from said environment, into said aqueous bath immediately after said subjecting step, whereby to release oil from said tar sands to float upwardly in said bath in a quiescent area thereof; and recovering said oil.

4,017,378

BINDERS FOR ELECTRODES

Christian Pierre Maurice Fauveau, Lavera; Albert Julus Lucien Bonzom, Sausset les Pins, and Anne Marie Eugenie Moutard nee Andre, Paris, all of France, assignors to The British Petroleum Company Limited, London, England

Filed Nov. 11, 1974, Ser. No. 522,911

Claims priority, application France, Nov. 12, 1973, 73.40152

Int. Cl.² C10G *37/06*

U.S. Cl. 208—41 **5 Claims**

1. A process for the manufacture of binders suitable for use in electrodes, consisting of distilling at atmospheric pressure at a residue temperature of from 150° to 450° C. a residue boiling predominantly above 200° C. obtained from a high temperature cracking of a naphtha petroleum fraction, to give a pitch having a KS softening point of from 55° to 90° C. and thermally ageing the pitch at a temperature of from 350° to 450° C. and at atmospheric pressure for from 1 to 20 hours to increase the KS softening point to between 80° and 100 C., said ageing being carried out by recycling the pitch at the base of the distillation column.

4,017,379

CONVERSION PROCESS OF HYDROCARBONS

Tetsuya Iida; Hideo Saori, both of Yokohama; Masao Inoguchi, Tsukui, and Hiroo Tominaga, Matsudo, all of Japan, assignors to Showa Oil Company, Ltd., Tokyo, Japan

Filed May 7, 1975, Ser. No. 575,386

Claims priority, application Japan, Nov. 7, 1974, 49-127479

Int. Cl.² C10G *13/06, 23/02, 37/04*

U.S. Cl. 208—68 **8 Claims**

1. A process for converting hydrocarbon wherein the process comprises (a) a step of thermal cracking of a tar-sand bitumen and vacuum residues having a boiling point of more than 530° C from various petroleum origins at a temperture of 400°14 800° C, a hydrogen pressure of 1–200 Kg/cm² and a contact time of 10–500 seconds to increase the amount of asphaltenes contained in the thermal cracked oil to 1.2 – 3.0 times of the amount of asphaltenes originally contained in the starting material and (b) a step of hydrocracking of the entire product oil obtained by the process of the step (a) at a temperature of 350°–500° C, a hydrogen pressure of 50–300 Kg/cm² and a liquid hourly space velocity of 0.1 – 5, in the presence of a catalyst supporting a metal or metals selected from the 6th and 8th groups of the periodic table on a carrier.

4,017,380

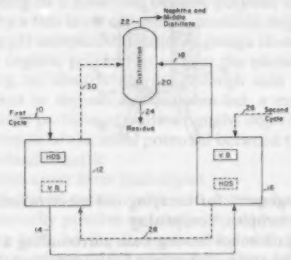
SEQUENTIAL RESIDUE HYDRODESULFURIZATION AND THERMAL CRACKING OPERATIONS IN A COMMON REACTOR

William H. Byler, Allison Park, and Angelo A. Montagna, Monroeville, both of Pa., assignors to Gulf Research & Development Company, Pittsburgh, Pa.

Filed July 18, 1975, Ser. No. 597,400

Int. Cl.² C10G *23/00, 34/00*

U.S. Cl. 208—89 **10 Claims**



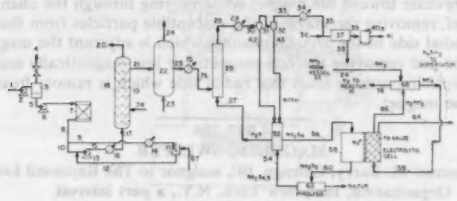
1. A process comprising passing a first stream of residual oil containing metals and sulfur together with hydrogen downflow through a zone containing a packed bed of hydrodesulfurization catalyst comprising supported Group VI and Group VIII metals under hydrodesulfurization conditions including a space velocity between about 0.1 and 10 volumes of oil per volume of catalyst per hour, a hydrogen rate between about 500 and 10,000 SCF per barrel of oil and at a hydrogen pressure between about 50 to 5,000 psi, incrementally increasing the temperature in said zone within the range of about 690 to about 790° F. to compensate for loss of catalyst activity with age until said catalyst is deactivated for hydrodesulfurization, subsequently passing a second stream of residual oil and hydrogen upwardly through said zone containing said deactivated hydrodesulfurization catalyst under cracking conditions including a temperature above said hydrodesulfurization temperature up to 1,000° F. in the presence of hydrogen at a flow rate between about 500 to 10,000 SCF per barrel of oil, a hydrogen pressure between about 100 and 5,000 psi and an oil residence time between about 0.0014 and 5 hours to produce middle distillates.

4,017,381

PROCESS FOR DESULFURIZATION OF RESIDUA WITH SODAMIDE-HYDROGEN AND REGENERATION OF SODAMIDE

William Chalmers Baird, Jr.; Roby Bearden, Jr., and Ralph Louis Bollinger, Jr., all of Baton Rouge, La., assignors to Exxon Research and Engineering Company, Linden, N.J.

Filed Apr. 28, 1975, Ser. No. 571,955
Int. Cl.² C10G 23/00
U.S. Cl. 208—143 18 Claims



1. A process for the desulfurization and hydroconversion of a sulfur-containing petroleum oil feedstock, which comprises

contacting a sulfur-containing petroleum oil feedstock, in a desulfurization-hydroconversion zone, with sodamide in the presence of added hydrogen, said feedstock being maintained substantially in the liquid phase, thereby forming an oil-salt mixture comprising a sulfur-reduced oil phase and a salt phase, said salt phase comprising a sodium sulfur salt;

treating said mixture with hydrogen sulfide to form a dispersion of sodium hydrosulfide in the sulfur-reduced oil;

separating said oil from said sodium hydrosulfide and recovering said sulfur-reduced oil;

converting said sodium hydrosulfide to a sulfur-depleted sodium polysulfide;

converting said sodium polysulfide to sodamide; and

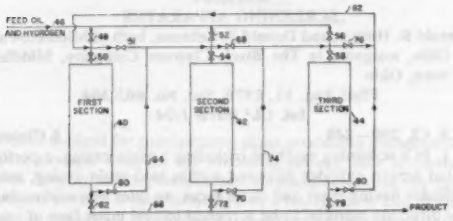
returning at least a portion of the so-regenerated sodamide to said desulfurization-hydroconversion zone.

4,017,382

HYDRODESULFURIZATION PROCESS WITH UPSTAGED REACTOR ZONES

William S. Bonnell, Mt. Lebanon; Robert D. Christman, Pittsburgh; Jordan S. Lasher, Pittsburgh; John A. Paraskos, Pittsburgh, and Stephen J. Yanik, Valencia, all of Pa., assignors to Gulf Research & Development Company, Pittsburgh, Pa.

Filed Nov. 17, 1975, Ser. No. 632,374
Int. Cl.² C10G 23/02
U.S. Cl. 208—210 5 Claims



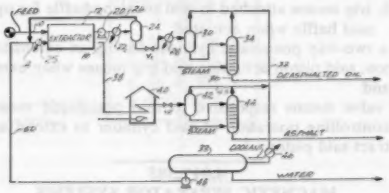
1. A process for the hydrodesulfurization of a metal- and sulfur-containing asphaltenic feed oil comprising (a) passing said oil and hydrogen downwardly through at least three fixed bed catalytic hydrodesulfurization zones connected in series so the reaction effluent from each of said zones is passed downwardly through the next zone in said series; (b) the hydrodesulfurization reaction in said zones being conducted at a temperature of 600° to 900° F., a hydrogen pressure of 500 to 5,000 psi, and with a catalyst in each of said zones comprising supported Group VI-B and Group VIII metals; (c) said feed oil being charged directly to one of said series zones, the zone receiving said feed oil constituting the upstream zone in the series, the reaction effluent from said upstream zone being passed downwardly through the first succeeding downstream zone and the reaction effluent from said first succeeding downstream zone being passed downwardly through the second succeeding downstream zone; (d) removing the upstream zone from service upon catalyst deactivation therein and charging said feed oil directly to said first succeeding downstream zone, (e) removing deactivated catalyst from and charging fresh catalyst to said removed upstream zone, (f) subsequently removing said first succeeding catalyst zone from service upon catalyst deactivation therein, returning said upstream zone containing fresh catalyst to said series as the final zone receiving said reaction effluent in said series, and charging said feed oil directly to said second succeeding downstream zone, (g) removing deactivated catalyst from and charging fresh catalyst to said removed first succeeding zone so that said first succeeding catalyst zone is being subsequently returned to said series as the final zone receiving said reaction effluent in said series, and (h) continuing said sequence so that each downstream zone becomes in succession an upstream zone and upon catalyst deactivation is removed from said series for catalyst replacement and subsequent return to said series as the final zone receiving said reaction effluent in the series.

4,017,383

SOLVENT DEASPHALTING PROCESS BY SOLVENT RECOVERY AT STAGED PRESSURES

David K. Beavon, Pasadena, Calif., assignor to Ralph M. Parsons Company, Pasadena, Calif.

Filed May 15, 1975, Ser. No. 577,694
Int. Cl.² C10G 21/14
U.S. Cl. 208—309 7 Claims



1. In a process for the deasphalting of a hydrocarbon feed wherein the feed is contacted with a liquefied low molecular weight solvent at an elevated temperature and pressure in an extraction zone, the quantity of solvent employed being sufficient to form a liquid deasphalted hydrocarbon oil-solvent mixture and a fluid heavy hydrocarbon-solvent mixture followed by recovery of solvent from each mixture for recycle to the extraction zone, the improved method of solvent recovery and recycle which comprises:

a. pressurizing and heating at least a portion of the elevated temperature, deasphalted hydrocarbon oil-solvent mixture from the extraction zone to a pressure and temperature above the temperature and pressure of the extraction zone;

b. evaporating a portion of the solvent from the pressurized, heated mixture in an evaporation zone maintained at a pressure and temperature above the pressure and temperature in the extraction zone;

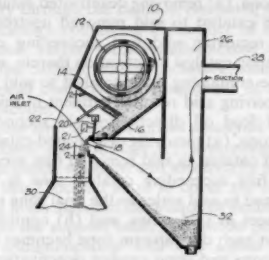
c. condensing and combining the elevated pressure, evaporated solvent with residual, recycled cooled solvent recovered from the hydrocarbon oil-solvent and heavy hydrocarbon-solvent mixtures to form a liquid solvent mixture at a pressure sufficient for introduction to the extraction zone, the quantity of solvent evaporated in the evaporation zone being sufficient on condensation to furnish at least about 50% of the heat required to heat the recycled, cooled solvent to the temperature required for introduction to the extraction zone, and

d. returning the liquid solvent mixture to the extraction zone at a temperature and pressure sufficient for deasphalting the hydrocarbon feed.

4,017,384
PNEUMATIC BYPASS SYSTEM FOR AIR WASH SEPARATORS

Ardee H. Freeman, and Bruce H. Berger, Jr., both of Granger, Ind., assignors to Wheelabrator-Frye, Inc., Mishawaka, Ind.

Filed Nov. 3, 1975, Ser. No. 628,540
Int. Cl.² B07B *11/06*
U.S. Cl. 209—149 **6 Claims**



1. In an air wash separator for separating a mixture of lighter particles from denser particles including means for passing air through the separator and means for feeding said mixture to the air passing through the separator, the means for feeding including a separator lip over which said mixture passes a swinging baffle controlling passage of particles over said lip, a counter balance for adjusting the operation of said baffle, the improvement comprising:

a surge bypass system including:

a. pneumatic means for sensing lighter particle overflow in said feed means,

b. trip means attached to said swinging baffle for opening said baffle when actuated;

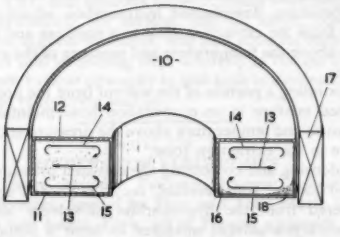
c. a two-way pneumatic cylinder having an extensible piston, said piston actuating said trip means when extended; and

d. valve means responsive to said pneumatic means for controlling operation of said cylinder to extend and retract said piston.

4,017,385
MAGNETIC SEPARATOR SYSTEMS

Peter Harlow Morton, 12 Danford Lane, Solihull, Warwickshire; Enrico Cohen, 66 Wolsey Road, Moor Park, Northwood, Middlesex HA6 2EH, and Jeremy Andrew Good, 72 Lexham Gardens, London W8, all of England

Filed Sept. 6, 1974, Ser. No. 504,669
Claims priority, application United Kingdom, Sept. 11, 1973, 42566/73; July 17, 1973, 31657/73
Int. Cl.² B03C *1/00*
U.S. Cl. 209—214 **12 Claims**

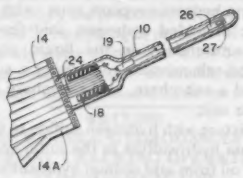


10. A method of separating magnetically susceptible particles from a mixture of magnetically susceptible particles and non-magnetic or less magnetically susceptible particles comprising the steps of introducing a stream containing the mixture in a fluidized condition under pressure or under gravity into one end of an arcuate separation channel having an inlet end and an outlet end and arcuate inner and outer walls and at least one connecting wall which constrain the stream to flow in a single undirectional arcuate path along the channel in frictional contact with the inner and outer walls and with the connecting wall, the velocity of the stream and the frictional resistance to flow being such that the stream is subject to sufficient centrifugal force as it flows around the channel that there is produced in the channel a secondary circulation radially outwardly within the body of the stream and then radially inwardly, subjecting the stream during its passage around the channel to a radial magnetic field gradient from a fixed magnet so that the magnetic force and the secondary circulation cooperate to cause the magnetically susceptible particles to gravitate toward the magnet while moving through the channel, removing the magnetically susceptible particles from that radial side of the arcuate channel which is adjacent the magnet and removing the non-magnetic or less magnetically susceptible particles from that radial side which is remote from the magnet.

4,017,386
MAGNETIC SWEEPER

Samuel M. Barry, Chicago, Ill., assignor to The Raymond Lee Organization, Inc., New York, N.Y., a part interest

Filed Oct. 28, 1975, Ser. No. 626,171
Int. Cl.² B03C *1/30*
U.S. Cl. 209—215 **6 Claims**



1. A rake, the tines of which are magnetizable for the attraction and retention of magnetically attractable debris, comprising

a handle section mounted at one end to a hollow housing, with

a plurality of rake tines joined together by one or more spreader bars, said rake tines and spreader bar each being formed of a magnetizable material, said tines comprising

a first set of said rake tines extending into said housing, and

a second set of rake tines which do not extend into the housing,

magnetic means mounted in said housing to magnetize the sections of the first set of tines extending into said housing,

said spreader bars serving to conduct the magnetic field from said first set of tines to the said second set of tines.

4,017,387
SCREENING APPARATUS

Derald R. Hatton, and Donald F. Lehman, both of Middletown, Ohio, assignors to The Black Clawson Company, Middletown, Ohio

Filed Aug. 11, 1975, Ser. No. 603,304
Int. Cl.² B07B *1/04*
U.S. Cl. 209—240 **5 Claims**

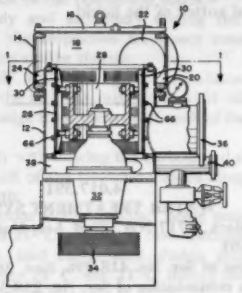
1. In a screening machine including a main casing, a perforated screen cylinder disposed within said main casing, said cylinder having inner and outer faces, an inlet into said casing for directing material to be screened to said inner face of said cylinder, an outlet from said casing for removing from said casing screened material which has passed through said cylinder from said inner face to said outer face thereof, means fixing said cylinder to said casing to prevent rotation of said cylinder, and cleaning foils mounted for rotation within said cylinder adjacent said inner face of said cylinder to maintain said perforations unobstructed, the improvement comprising:

a plurality of uninterrupted, discrete slots extending completely through said cylinder from said inner to said outer face thereof,

said slots being arranged in a plurality of circumferentially arranged bands extending about said cylinder,

each of said bands being spaced from each other longitudinally of said cylinder,

said bands being interrupted at spaced intervals by unperforated cantilevered sections extending longitudinally of said cylinder, and



said cantilevered sections and said foils are of such number and arranged with respect to each other such that said foils and said cantilevered sections cannot be aligned with each other.

4,017,388

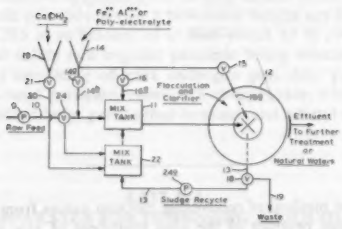
SPLIT TREATMENT PHOSPHORUS REMOVAL FROM WASTE

Orris E. Albertson, Norwalk, Conn., assignor to Dorr-Oliver Incorporated, Stamford, Conn.

Continuation-in-part of Ser. No. 145,579, May 20, 1971, abandoned, which is a continuation-in-part of Ser. No. 852,280, Aug. 22, 1969, abandoned. This application Jan. 26, 1973, Ser. No. 326,795

Int. Cl.² C02B *1/02*

U.S. Cl. 210—5 **1 Claim**



1. A method for precipitating algae producing phosphorous from sewage, wherein the incoming sewage flow is treated with lime to effect precipitation of phosphate, and the thus treated sewage is then subjected to a flocculation and clarification operation producing an overflow of clarified sewage and phosphate sludge as underflow,

characterized thereby that an amount of underflow sludge equal to about 50% of the incoming raw feed flow, containing about 180 mg. of lime per liter at a pH of about 9.0 to 9.5, is recycled to a first mixing stage, that about 360 mg. of lime is added per liter of recycle sludge in said first mixing stage, equal to about 180 mg. of lime per liter of incoming feed, thereby raising the pH to about 11 with concurrent water softening effect, and that the thus treated recycled material is mixed with the incoming raw feed in a second mixing stage, thereby lowering the pH of the total flow to 9.0 to 9.5 with a resultant net phosphate precipitate contained in said underflow sludge derived from said flocculation and clarification operation.

4,017,389

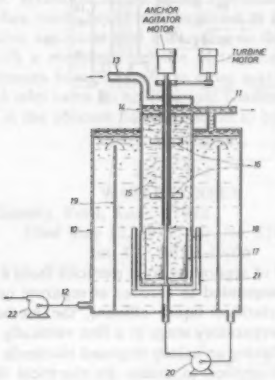
METHOD AND APPARATUS FOR CONTINUOUSLY SEPARATING EMULSIONS

James E. Heath, and Webster M. Sawyer, both of Houston, Tex., assignors to Shell Oil Company, Houston, Tex.

Filed June 6, 1975, Ser. No. 584,450

Int. Cl.2 B01D *17/04*

U.S. Cl. 210—23 R **3 Claims**



1. A method for continuous two-stage separation of the phases of a liquid-liquid emulsion having a disperse phase of 30 ppm to 5,000 ppm and a continuous phase comprising:

providing a liquid suspension of 500 ppm to 20,000 ppm of continuous phase wet, disperse phase trapping fibers within a chamber located concentrically within a vessel;

admitting liquid-liquid emulsion into the chamber;

agitating the fibers and emulsion to break at least part of the emulsion in the chamber into a first disperse phase and a first continuous phase;

allowing the first disperse phase to float to the top of the chamber and withdrawing the first disperse phase therefrom;

discharging the first continuous phase and remaining emulsion from the chamber through a fiber filter on a fiber impermeable screen and into the vessel, thereby breaking the remaining emulsion into a second disperse phase and a second continuous phase;

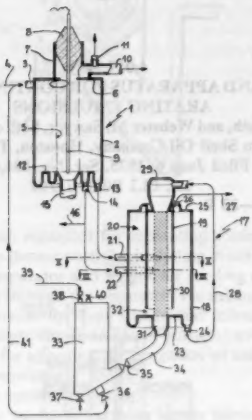
flowing the second disperse phase and second continuous phase to the top of the vessel, withdrawing the second disperse therefrom, flowing the second continuous phase over and down around an annular baffle, and withdrawing the second continuous phase from the vessel; and

combining and discharging the first and second continuous phases from the vessel.

4,017,390
METHOD FOR SEPARATING SOLID POLLUTANTS FROM FLUIDS

Jean-Francois Vicard, Lyon, France, assignor to Societe Lab, Saint Dider Au Mont D'or, France

Filed May 28, 1975, Ser. No. 581,519
Claims priority, application France, June 7, 1974, 74.20622
Int. Cl.² C02B *1/82*
U.S. Cl. 210—42 R 4 Claims



1. The method of separating solid particles from a liquid in which they are suspended to recover at separate outlets the particles and a clarified liquid effluent, the method being performed at a preparatory stage in a first vertically oriented cylindrical body having an axially disposed electrode to which a high voltage is applied to create an electrical field with respect to the body, and being performed at a concentrator stage in a second vertically oriented cylindrical body having an axially disposed hollow filter passing therethrough, and the second cylindrical body having a first inlet entering tangentially through its outer periphery and coupled to take liquid from the outer periphery of the first body, and the second body having a second inlet entering therethrough and opening tangentially thereinto at a location near the filter and coupled to take liquid from the first body near said electrode, including the steps of:

centrifuging a liquid mass containing the particles by introducing it tangentially under high pressure into said first cylindrical body to form a first vortex of the liquid around the electrode and out of electrical contact therewith, whereby the electrical field of the electrode agglomerates particles and the centrifugal force concentrates them toward the outer periphery of the first body while leaving a more clarified liquid near the electrode;

withdrawing from the first body above the first vortex the lighter particle, foam, and gases which become separated from the rotating liquid;

transferring liquid and particles from the preparatory stage to the first and second inlets of the concentrator stage;

centrifuging the liquid and particles in said concentrator stage by whirling them inside the second body to form a second vortex of liquid around said filter and spaced therefrom, whereby the centrifugal force concentrates particles outwardly of the centrifuging liquid to leave clarified liquid near said second vortex of the centrifuging liquid;

withdrawing liquid containing concentrated particles near the outer periphery of the second body and introducing it into one end of the hollow filter;

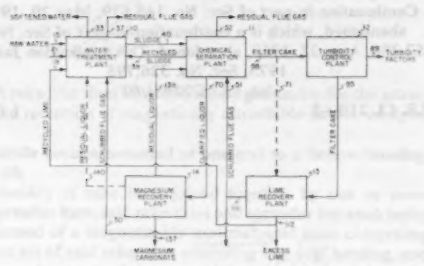
withdrawing a sludge of the particles from the other end of the hollow filter; and

withdrawing clarified liquid from the second body near the second vortex of the liquid.

4,017,391
WATER TREATMENT SYSTEM

Alvin P. Black, 1717 NW. 23rd Ave, Unit 3"b", Gainesville, Fla. 32601

Continuation of Ser. No. 418,896, Nov. 26, 1973, abandoned, which is a continuation of Ser. No. 258,369, May 31, 1972, abandoned, which is a continuation-in-part of Ser. No. 136,094, April 21, 1971, abandoned. This application July 6, 1976, Ser. No. 702,954
Int. Cl.² C02B *1/22*
U.S. Cl. 210—44 39 Claims



1. The method of recovering calcium values from an aqueous sludge product of the lime treatment of raw water and which is separated from the treated water and contains an aqueous component and an intimate mixture of precipitated calcium carbonate and precipitated magnesium hydroxide, said method comprising the steps of:

A. carbonating the separated aqueous sludge product to solubilize the precipitated magnesium hydroxide of the separated sludge product in the aqueous component of the separated sludge product, thereby to provide a carbonated sludge product which has a liquid phase component that contains the solubilized magnesium hydroxide and which has residual solids that include the precipitated calcium carbonate,

B. separating the residual solids from the liquid phase component of the carbonated sludge product, and

C. calcining the precipitated calcium carbonate of the separated residual solids obtained from the separating step (B) and recovering the calcium values of the separated aqueous sludge product as a calcined lime product;

said carbonating step comprising steps of:

A-1. maintaining a flow path of the separated aqueous

sludge product through a plurality of serially connected sludge treatment zones by continuously introducing progressively diminishing portions of the separated aqueous sludge product to successive treatment zones along the path of the maintained flow,

A-2. continuously introducing scrubbed flue gases at the bottoms of each of the respective zones,

A-3. continuously and intimately mixing the flue gases introduced in the respective treatment zones with the flowing aqueous sludge therein,

A-4. continuously withdrawing the introduced gases remaining from the intimate mixture thereof with the flowing aqueous sludge from the tops of each of the respective zones, and

A-5. continuously withdrawing the carbonated sludge product from the last of the treatment zones along the maintained flow path;

said separated aqueous sludge product being maintained between 15° C. and 21° C. during its flow through the sludge treatment zones, said carbonated sludge product being maintained between 15° C. and 21° C. during the separation step (B),

said flowing aqueous sludge being maintained under substantially atmospheric pressure conditions during its flow through the treatment zones, and

said portions of the separated aqueous sludge product introduced to the treatment zones having a magnesium content less than 6.5 grams per liter (as MgO).

4,017,392

ORGANIC PEROXIDES AS SLIME SETTLING AGENTS

Martin Hamer, Skokie, and Othmer F. Batzer, Libertyville, both of Ill., assignors to International Minerals & Chemical Corporation, Libertyville, Ill.

Filed Dec. 22, 1975, Ser. No. 643,447
Int. Cl.² C02B *1/20*
U.S. Cl. 210—54 **13 Claims**

1. A process for settling finely-divided mineralogical waste slime solids from a phosphate ore processing operation including colloidal argillaceous material from an aqueous suspension thereof which comprises adding to said suspension, in an amount effective to enhance the settling of said solids, at least one organic peroxide having a molecular weight not in excess of about 225 in an amount of at least about 10 lb per ton of suspended solids said organic peroxide being selected from the group consisting of urea hydrogen peroxide, peracetic acid, di-t-butyl peroxide, cumene hydroperoxide, t-butyl hydroperoxide, t-butyl per-2-ethyl hexoate, and t-butyl perbenzoate.

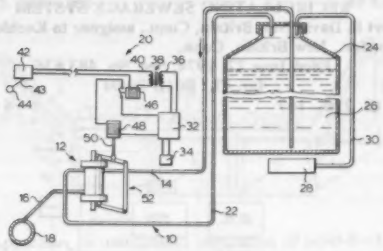
4,017,393

APPARATUS FOR DISPENSING A LIQUID

H. Rodney Foggett, Toronto, Canada, assignor to Her Majesty the Queen in right of Ontario as represented by the Minister of the Environment, Toronto, Canada

Filed Feb. 23, 1976, Ser. No. 660,247
Int. Cl.² C02B *1/23*
U.S. Cl. 210—101 **12 Claims**

1. An apparatus for dosing a treatment solution into a waste liquid comprising a device for measuring and dispensing a predetermined volume of treatment solution, means for delivering treatment solution from a reservoir to said device and means for delivering a measured volume of treatment solution from said device to a waste liquid to be dosed, and control means adapted to determine when waste liquid is present to be dosed and activate said device to dispense a measured volume of treatment solution into a waste liquid, said device having a container which defines a chamber of predetermined volume with an inlet in communication with said means for delivering treatment solution to said device and an outlet in communication with said means for delivering treatment solution to waste liquid, an inlet valve and an outlet valve provided respectively at said inlet and said outlet, air vent means for venting said chamber during the filling and dispensing of treatment solution, said air vent means being adapted to prevent overflow of treatment solution from said vent means to the surroundings, reversible actuation means for simultaneously opening said inlet valve and closing said outlet valve to permit filling of said chamber with a treatment solution and for simultaneously closing said inlet valve and opening said outlet valve to permit



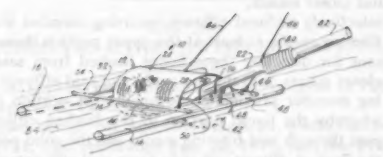
dispensing a measured volume of treatment solution, said reversible actuation means being operated by said control means when waste liquid is to be dosed to thereby open said outlet valve and close said inlet valve so that waste liquid is dosed with a measured volume of treatment solution, said control means being adapted to close said outlet valve and open said inlet valve for refilling said chamber with treatment solution in the absence of waste liquid to be dosed.

4,017,394

WATER SCREEN

Roy A. Hensley, Ford, Kans. 67842

Filed May 12, 1975, Ser. No. 576,682
Int. Cl.² B01D *33/06*
U.S. Cl. 210—157 **6 Claims**



1. A stream powered, self-cleaning rotary strainer for use in drawing water from a running body of water, the strainer comprising:

a strainer frame;

a drum having a perforate sidewall, an open end, and a closed end, said drum rotatably mounted on said strainer frame about its longitudinal axis;

a plurality of paddles rigidly mounted on the closed end of said drum and extending outwardly therefrom in a spaced relationship around the circumference of the closed end of said drum, said paddles parallel to the longitudinal axis of said drum, said paddles co-acting with the flow of the body of water to rotate said drum on said strainer frame;

a float assembly rigidly mounted on said strainer frame, said strainer frame and said float assembly constructed and adapted to position said drum in a partially submerged condition in the body of water with the longitudinal axis of said drum disposed transverse to the direction of flow of the body of water; and

a water withdrawing conduit mounted on said strainer frame and having the inlet inside a lower portion of the perforate sidewall of said drum;

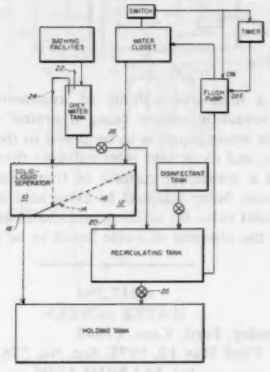
the rotary strainer being constructed and adapted to, in use, float in a moving body of water wherein said drum is rotated by said paddles passing debris around the sidewall of said

drum, the outlet of said conduit being connected in fluid communication with a pump, or the like, for removing water from within said drum.

4,017,395
RECIRCULATING SEWERAGE SYSTEM

Robert B. Davis, New Britain, Conn., assignor to Koehler-Dayton, Inc., New Britain, Conn.

Filed June 27, 1974, Ser. No. 483,636
Int. Cl.² B01D 29/04
U.S. Cl. 210—167 4 Claims

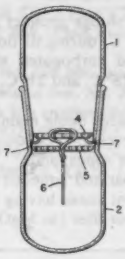


1. A recirculating sewerage system comprising
water closet means,
a selectively inclined effluent receiving member including filtering media at least at the upper portion thereof,
means for directing the effluent flushed from said water closet means onto the top surface of said effluent receiving member proximate the uppermost portion thereof, whereby the liquid portion of the flushed effluent will pass through said filtering media and the solid portion of the flushed effluent will slide down said effluent receiving member,
means for collecting the portion of the flushed effluent which filters through said filtering media,
means for selectively draining said filtrate collecting means,
means for collecting the portion of the flushed effluent which slides off of said effluent receiving member,
means for priming said filtrate collecting means with a predetermined volume of grey water including
a reservoir for receiving grey water discharged from a bathing facility, the volume of said reservoir being selected so that said predetermined volume of grey water can be contained therein, and
means for selectively draining said reservoir into said filtrate collecting means,
means for selectively directing the collected filtrate to said water closet means to flush same, and
means for directing grey water received by said reservoir to the bottom portion of said effluent receiving member when the level of the grey water contained in said reservoir exceeds a predetermined maximum level substantially corresponding to the level of said predetermined volume of grey water contained therein whereby any solids which remain on said effluent receiving member will be washed therefrom into said solids collecting means.

4,017,396
CENTRIFUGAL FILTRATION TUBE FOR REMOVAL OF THE MOTHER LIQUOR FROM THE CRYSTALS IN THE PURIFICATION OF A CHEMICAL COMPOUND BY RECRYSTALLIZATION

Evald L. Skau, New Orleans, La., assignor to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.

Continuation-in-part of Ser. No. 445,742, Feb. 25, 1974, abandoned. This application Sept. 19, 1975, Ser. No. 615,039
Int. Cl.² B01D ; C02B ; C02C
U.S. Cl. 210—232 3 Claims



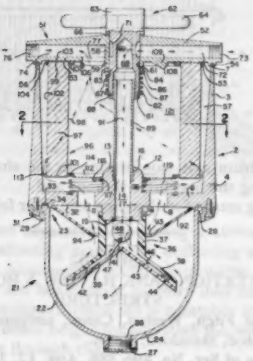
1. An apparatus for purifying chemical compounds by recrystallization comprising in combination:
a. a male glass segment comprising an enclosed rounded end extending into flat sides and then extending into tapered sides with an open end, said tapered sides tapered inwardly and ground on the outside surface thus forming substantially a ground tapered joint;
b. a female glass segment comprising an enclosed rounded end extending into tapered sides and an open end, said tapered sides tapered outwardly and ground on the inside surface thus forming substantially a ground tapered joint;
c. said male segment assembled to the female segment with said outer ground glass surface of said male segment directly in contact with the said inner ground glass surface of the said female segment thus substantially forming a leak-tight sealing surface, and
d. a porcelain disk strainer or filter segment having a beveled edge constructed with a top circular circumference equivalent to the inside circumference of the tapered male segment except for two parallel flat sides which are spaced a few tenths of a millimeter closer together than the inside diameter of the small end of the male joint so that the strainer can be inserted sideways into the male segment and said strainer or filter segment positioned athwart the inner diameter of the tapered male segment said strainer's circumferential edge forming a tight fit seal with said inner ground glass surface of said male segment and said strainer or filter affixed to the male segment by means of hooks;
e. a thin round porcelain disk with a beveled edge thus substantially forming a splash shield said splash positioned just below the strainer or filter disk athwart the female segment of the assembled apparatus with the outer circumference of the splash shield in direct contact with the inner surface of the female tapered segment thereby imparting structural rigidity to the splash shield, said splash shield having a hole through the center thereof;
f. a wire handle located through the hole in the center of the splash shield and affixed to the said porcelain strainer.

4,017,397

FILTER DEVICE FOR DIESEL ENGINES

Shannon B. Copeland, 3104 Scenic Drive, Modesto, Calif. 95355

Filed Dec. 2, 1974, Ser. No. 528,679
Int. Cl.² B01D *27/08*
U.S. Cl. 210—238 7 Claims



1. A fuel filter device for diesel fuel comprising:

a main body portion open at one end and having an apertured end wall at the other end, said main body portion constituting a filter chamber;

a fuel expansion chamber attached to the apertured end wall of the main body, said fuel expansion chamber constituting a depressurization zone;

a baffle system enclosed within said fuel expansion chamber to control the flow of fuel therethrough, said baffle system including an upper skirt portion having a central aperture, lower conical portion spaced therebelow, and a plurality of radiate rib structures which project between said upper skirt portion and said lower conical portion to provide passageways between successive radiating ribs through which fuel flows into said expansion chamber is substantially laminar flow so as to separate entrained air, water and solids from said fuel by gravity separation;

a cover plate sealingly engaging the open end of the filter chamber and including inlet and outlet passageways therein at substantially the same level in relation to the filter chamber;

a handle assembly rotatably journaled on the cover plate and including an elongated conduit connecting said inlet passageway with the central aperture in said baffle system within said expansion chamber whereby fuel is caused to flow through said baffle system and into said fuel expansion chamber for depressurization and separation prior to flowing through said filter chamber; and

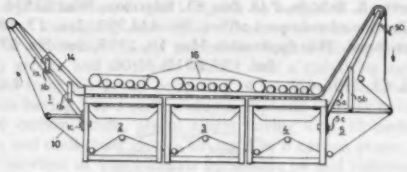
a fuel filter element disposed within said filter chamber and disposed concentrically about said elongated conduit, said fuel filter being arranged in relation to said filter chamber so that fuel flows from said baffle system upwardly through said apertured end wall of said main body portion, surrounds the exterior of the filter element, and flows radially inwardly through the filter element and thence upwardly through the interior thereof to be discharged directly into said outlet passage, said outlet passage communicating directly with the interior of the filter chamber and the filter element being closed at its end remote from said apertured end wall, whereby the fuel must pass through said filter before reaching the outlet passageway.

4,017,398

DEVICE FOR THE CONTINUOUS SEPARATION OF MIXTURES OF SOLIDS AND FLUIDS

Otto Hartmann, Stuttgart; Hans Brunner, Steinmaur, and Thomas Hartmann, Berlin, all of Germany, assignors to Firma Hamako Hartmann, Berlin, Germany

Filed Aug. 11, 1975, Ser. No. 603,567
Claims priority, application Germany, Aug. 13, 1974, 2439176
Int. Cl.² B01D *33/32*
U.S. Cl. 210—350 15 Claims



1. Apparatus for continuous separation of solid-fluid mixtures comprising:

a. an endless band of filter cloth folded to form an endless tube which is longitudinally openable and closable and routing means to permit cyclically introducing a mixture into the tube for filtering, filtering and removal of solids following filtering;

b. inlet means for introducing the the mixture into the tube;

c. a filter unit providing a channel for passage of the tube filled with the mixture and folded as aforesaid, for filtration of fluid from the mixture, the cross sectional flow area of the channel being adjustable;

d. means for opening the filter tube following the filter unit for discharge of solids from the tube;

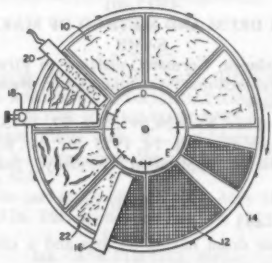
e. the inlet means and the filter unit being mounted on a first frame and the opening means being mounted on a second frame, said frames being separable to provide a modular construction.

4,017,399

METHOD AND APPARATUS FOR FILTRATION OF SLURRIES

Edwin B. Lopker, Fort Lauderdale, Fla., assignor to Pullman Incorporated, Chicago, Ill.

Division of Ser. No. 806,087, March 11, 1969, Pat. No. 3,608,721. This application Feb. 26, 1971, Ser. No. 119,416
Int. Cl.² B01D *23/24*
U.S. Cl. 210—408 1 Claim



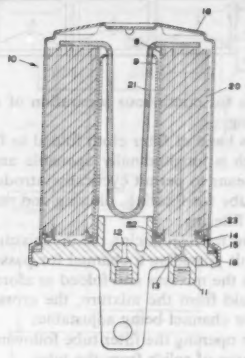
1. In a filter wherein a filter cake is formed on a filter medium, the combination therewith of means for loosening particles from the surface of the filter cake, said means comprising at least one adjustable wire rake, said rake comprising a plurality of substantially hairpin shaped wires connected to said rake at the open end of the hairpin, the closed end of the hairpin extending downwardly whereby the closed end of the hairpin will sweep the surface of the filter cake and loosen

particles therefrom, said rake being positioned so that particles loosened from said filter cake are not removed therefrom but are retained on the surface thereof, support means to adjustably support said rake so that adjustable abrading action may be applied to the surface of the filter cake, and means for applying a wash fluid to the portion of the cake having said loosed particles thereon.

4,017,400
OIL FILTER

Harvey R. Schade, P.O. Box 83, Edgerton, Wis. 53534

Continuation-in-part of Ser. No. 433,992, Jan. 17, 1974, abandoned. This application May 19, 1975, Ser. No. 579,032
Int. Cl.² B01D *27/00*
U.S. Cl. 210—439 **4 Claims**



1. In axial flow filtering apparatus for fluids which interstitially pass between leaves of an assemblage of tissue within a confining vessel, an improvement comprising means sealably partitioning said vessel isolating one transverse face of said assemblage of tissue from a second transverse face of said assemblage of tissue against communicating by-pass flow of fluid past said assemblage of tissue wherein said means is of a configuration comprising at least one relatively uniform, thin annular substantially cylindrically uniform outer diameter lip projecting baffle-like interstitially in overlapped interposition with said leaves at said one face, interlocking with said leaves without substantial distortion of said assemblage of tissue to prevent fluid leakage past said assemblage of tissue.

4,017,401
STRAINER DRUM AND METHOD OF MAKING THE SAME

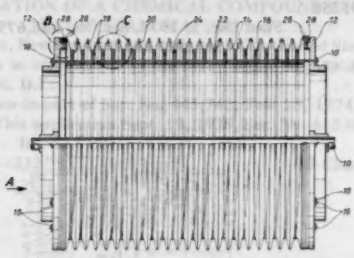
Emil Holz, Eningen, Germany, assignor to Firma Hermann Finckh Metalltuch-und Maschinenfabrik, Baden-Wurttemberg, Germany

Continuation of Ser. No. 428,897, Dec. 27, 1973, abandoned. This application Oct. 14, 1975, Ser. No. 622,438
Claims priority, application Germany, Jan. 8, 1973, 2300553
Int. Cl.² B01D *33/06*
U.S. Cl. 210—493 **6 Claims**

1. A strainer drum having an axis and a circumference, comprising

a. filter fabric supporting means including a series of apertured, axially juxtapositioned carrier discs defining axially spaced, alternating, circumferentially extending crests and roots;

b. a one-piece prefolded filter fabric positioned substantially 360° about said discs to be supported thereby, said filter fabric having circumferential folds, said filter fabric conforming to said crests and roots and being made of warps and wefts of non stretchable filaments extending obliquely with respect to the strainer to define a filter



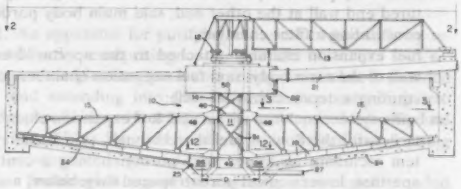
fabric drum axis, conforming to the shape of discs and overlying the apertures thereof and

c. securing means for clamping said filter fabric to said discs.

4,017,402
SEDIMENTATION TANK HAVING A ROTARY RAKE STRUCTURE

Elliot Bryant Fitch, Weston, Conn., assignor to Dorr-Oliver Incorporated, Stamford, Conn.

Continuation of Ser. No. 496,386, Aug. 12, 1974, abandoned. This application July 7, 1975, Ser. No. 594,373
Int. Cl.² B01D *23/18*
U.S. Cl. 210—528 **16 Claims**



1.

A continuously operating settling tank which comprises in combination slurry feeding means for the tank, overflow means for supernatant liquid, a tank bottom having a central sludge collecting zone provided with sludge discharge means,

a rotary sludge raking structure and means for supporting said structure for rotation about a vertical axis, said raking structure comprising radial rake arms, a sequence of sludge raking blades fixed to the underside of at least one of said arms and spaced from one another along said arms, said blades being set at an angle to the direction of their path of movement so that sludge is conveyed by said blades to said collecting zone incident to rotation of the rake structure,

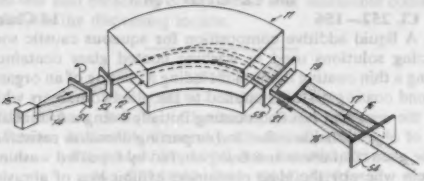
said spaced blades on each arm comprising a group of inner blades operating in an inner zone adjacent to and surrounding said central sludge collecting zone, each of said inner blades having a substantially vertical upper body portion, a forwardly extending lower end portion shaped so as to present a rigid forwardly directed slicing edge, adapted to provide a forward lifting effect upon the sludge mass being engaged and moved by said blade, thereby inducing at the back side of said blade a downflow of liquid from a zone having a fluidity greater than that of the sludge mass being moved by the blade, into the space below said forwardly directed lower end portion, said downflow thus adapted to reach the interface between the sludge solids being moved by the blade and a bottom layer of residual material, whereby the frictional resistance of the sludge to the movement by the blades relative to said bottom layer is diminished;

and means for rotating the rake structure.

4,017,403
ION BEAM SEPARATORS

James Harry Freeman, Abingdon, England, assignor to United Kingdom Atomic Energy Authority, England

Filed July 7, 1975, Ser. No. 593,188
Claims priority, application United Kingdom, July 31, 1974, 33863/74; July 31, 1974, 33864/74; July 31, 1974, 33865/74
Int. Cl.² H05K *3/06*
U.S. Cl. 250—492 A 26 Claims

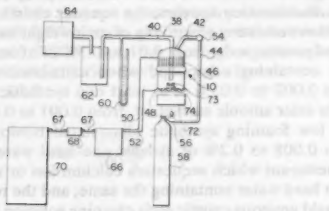


1. An ion beam separator comprising a curved ion beam passageway, a deflecting magnet for deflecting an ion beam injected into the passageway, and a beam width defining slit traversed by the ion beam prior to entry into the deflecting field of the said magnet, which slit is rotatable about an axis parallel with the beam height for adjusting the width of beam permitted to pass through the slit.

4,017,404
APPARATUS FOR LOW TEMPERATURE ASHING USING RADIO FREQUENCY EXCITED GAS PLASMA

Larry E. Habeger, Big Lake, Minn., assignor to The United States of America as represented by the Secretary of the Department of Health, Education and Welfare, Washington, D.C.

Filed Mar. 11, 1976, Ser. No. 665,878
Int. Cl.² B01K *1/00*; G01N *27/00*
U.S. Cl. 250—531 5 Claims



1. A low temperature ashing device comprising:
side and end walls defining a gas tight reaction chamber for containing a specimen to be ashed;
means communicating with said chamber for reducing the pressure therein;
means communicating with said chamber for supplying a stream of reaction gas thereto; and
RF means for coupling a radio frequency output to said gas and generating a plasma to produce low temperature ashing of a specimen therein, said RF means including a driven and receiving antenna pair having an annular antenna encompassing the side walls with a spaced substantially planer antenna associated with an end wall of said chamber.

4,017,405
SOLUBLE OIL COMPOSITION

LeRoy W. Holm, Fullerton, Calif., assignor to Union Oil Company of California, Brea, Calif.

Continuation-in-part of Ser. No. 345,184, March 26, 1973, Pat. No. 3,920,073. This application July 18, 1975, Ser. No. 597,085
Int. Cl.² E21B *43/16*; C09K *3/00*
U.S. Cl. 252—8.55 D 19 Claims

13. A soluble oil additive concentrate consisting essentially of an admixture of preferentially oil-soluble surface active alkyl aryl sulfonates, 0.1 to 1.5 parts by weight of a sulfated surfactant consisting essentially of an admixture of alkali metal or ammonium lauryl polyethoxy sulfate having 2 to 6 ethoxy groups and an amide builder, and a stabilizing agent selected from the group consisting of monohydric aliphatic alcohols having 3 to 5 carbon atoms, aliphatic ketones having 4 to 6 carbon atoms, glycol ethers having 4 to 12 carbon atoms, and dialkylene glycols having 4 to 6 carbon atoms, in the proportion of 1 to 12 parts by volume of said sulfonates per part of stabilizing agent.

4,017,406
CARBOXYLATE HALF ESTERS OF 1-AZA-3,7-DIOXABICYCLO[3.3.0] OCT-5-YL METHYL ALCOHOLS, THEIR PREPARATION AND USE AS ADDITIVES FOR OLEAGINOUS COMPOSITIONS

Stanley J. Brois, Wantage, England; Jack Ryer, East Brunswick, and Esther Winans, Colonia, both of N.J., assignors to Exxon Research and Engineering Company, Linden, N.J.

Filed May 1, 1975, Ser. No. 573,545
Int. Cl.² C10M *1/32*
U.S. Cl. 252—51.5 A 12 Claims

1. A lubricating oil composition comprising a major amount of lubricating oil and in the range of about 0.01 to 20 wt. % of an oil soluble ester which is the half ester reaction product of: (a) about 1 molar proportion of a hydrocarbyl substituted C_4 to C_{10} dicarboxylic acid or anhydride having about 6 to about 300 carbon atoms per hydrocarbyl group partly esterified with the reaction product of (b) either about 1 or 2 molar proportions of an aldehyde, or one molar proportion of ketone and one molar proportion of aldehyde, reacted with about 1 molar proportion of tris-(hydroxymethyl) aminomethane; said half ester reaction product having a 1-aza-3,7-dioxabicyclo[3,3,0] octyl ring.

12. A composition according to claim 1, wherein the amount of said half ester reaction product is about 0.01 to 5 wt. %, and said half ester is the half ester reaction product of octadecenyl succinic anhydride and the reaction product of two molar proportions of formaldehyde with one molar proportion of tris-(hydroxymethyl) aminomethane.

4,017,407
METHODS FOR PREPARING SOLID IODINE CARRIER MIXTURES AND SOLID FORMULATIONS OF IODINE WITH IODINE CARRIERS

Abraham Cantor, Elkins Park, Pa., and Murray W. Winicov, Flushing, N.Y., assignors to West Laboratories, Inc., Long Island City, N.Y.

Continuation-in-part of Ser. No. 360,338, May 14, 1973, Pat. No. 3,898,326. This application Jan. 27, 1975, Ser. No. 544,412
Int. Cl.² C11D *1/72*, *3/48*
U.S. Cl. 252—106 14 Claims

1. The solid PVP-iodide product obtained by first preparing an aqueous solution of poly (N-vinyl-2-pyrrolidone), a water soluble iodide selected from the group consisting of sodium, potassium, lithium, magenesium, hydrogen, calcium, ammonium, amine and a quaternary ammonium iodides, and a compatible additive selected from the group consisting of nonionic detergents and mixtures thereof in proportions to provide a (PVP plus nonionic detergent): I^- ratio in the range

of about 1:1 to 20:1, the amount of nonionic detergent not exceeding the amount of PVP, and drying said aqueous solution and particalizing the resulting solid to obtain a product in which individual particles contain the PVP, iodide and additive in homogeneous mixture.

4,017,408

WATER SOLUBLE LIQUID IODINE CONCENTRATE, AQUEOUS IODINE BACTERIOCIDAL SOLUTION AND METHODS OF MAKING THE SAME

Elmer H. Fults, 219 Woodward Drive, Tulare, Calif. 93274

Filed July 14, 1975, Ser. No. 595,560
Int. Cl.[2] C11D 3/34, 3/48
U.S. Cl. 252—106 3 Claims

1. A method of producing a water soluble iodine concentrate consisting essentially of dissolving 100 parts by weight of iodine in at least about 37 parts by weight of dimethyl sulfoxide, and dissolving the resultant system in a water solution surfactant selected from the group consisting of anionic and nonionic surfactants in an amount sufficient effectively to enhance the solubility of said system in water.

4,017,409

LIQUID HOUSEHOLD CLEANER

Emiel Mathilde Anna Alfons Demessemaekers, Cincinnati, Ohio; Guido Bognolo, Brussels, Belgium, and Gianfranco Luigi Spadini, Newcastle upon Tyne, England, assignors to The Procter & Gamble Company, Cincinnati, Ohio

Filed Jan. 20, 1976, Ser. No. 650,815
Int. Cl.[2] C11D 1/14, 1/37, 3/06
U.S. Cl. 252—109 8 Claims

1. A liquid, homogenous, stable, household cleaner composition, in particular for cleaning hard surfaces, containing anionic detersive surfactants, builder salts, and other usual cleaner additives, consisting essentially of:

A. from about 2% to about 15% by weight of a mixture of
   a. an anionic, organic, synthetic sulfonate, having the formula R_1SO_3M wherein R_1 is selected from the group consisting of alkyl groups containing from 10 to 20 carbon atoms, and wherein M represents a cation selected from the group consisting of sodium, potassium, ammonium and ethanol ammonium; and
   b. an anionic, organic synthetic sulfate having the formula R_2SO_4M wherein R_2 is selected from the group consisting of saturated or unsaturated, straight or branched aliphatic hydrocarbon groups containing from 8 to 18 carbon atoms, and M has the meaning given above;

whereby the weight ratio of (a) to (b) is between 3/2 and 10/1;

B. from about 3% to about 7.5% by weight of a water-soluble, organic or inorganic builder salt; and mixtures thereof;

C. from about 0.3% to about 3% by weight of a suds depressing system comprising a fatty ester of the general formula R_3COOR_4, wherein R_3 is an alkyl radical containing from 11 to 17 carbon atoms and R_4 is an alkyl radical containing from 2 to 4 carbon atoms; and sodium, potassium or ammonium soap of a fatty acid containing from 12 to 18 carbon atoms; whereby the ester/soap weight ratio is between 1/1 and 1/20; and

D. water;

wherein the weight ratio of (A) to (B) is between 5/1 and 1/2.

4,017,410

METHOD OF WASHING GLASSWARE AND INHIBITED CLEANING SOLUTION AND ADDITIVE COMPOSITION USEFUL THEREIN

Malachi E. Sorgenfrei, Grosse Ile, and Otto T. Aepli, Southgate, both of Mich., assignors to BASF Wyandotte Corporation, Wyandotte, Mich.

Division of Ser. No. 520,546, Nov. 4, 1974. This application Nov. 5, 1975, Ser. No. 628,979
Int. Cl.[2] C11D 7/06
U.S. Cl. 252—156 14 Claims

1. A liquid additive composition for aqueous caustic soda cleaning solutions used in washing coated glass containers having a thin coating thereon including a coating of an organic hot end coating material applied to the glass containers while hot, the resultant hot end coating initially being substantially free of objectionable color and imparting abrasion resistance to the glass containers and being altered by repeated washings therein whereby the glass containers exhibit loss of abrasion resistance or an objectionable discoloration appears, the additive composition consisting essentially of on a weight basis from about 15 to 20% of caustic soda, from about 2 to 5% of at least one soluble zinc containing compound when calculated as zinc oxide, from about 0.5 to 1% of at least one synthetic organic phosphate ester anionic surfactant, from about 0.2 to 0.6% of at least one low foaming synthetic alkoxylated nonionic surfactant, from about 2 to 5% of at least one hard water conditioning sequesterant which sequesters calcium ion or magnesium ion from hard water contaning the same and the remainder water, the said caustic soda, zinc containing compound, anionic surfactant, nonionic surfactant and sequesterant being dissolved in the liquid additive composition to form a homogeneous aqueous solution thereof which is compatible with aqueous caustic soda cleaning solutions, and the said liquid additive composition being effective to prolong the useful life of the said hot end coating including the coating of the organic hot end coating material when added to said aqueous caustic soda cleaning solutions in an amount to provide the zinc containing compound therein in a concentration of from about 0.01 to 0.3% by weight when calculated as zinc oxide.

8. An aqueous caustic soda cleaning solution for use in washing coated glass containers having a thin coating thereon including a coating of an organic hot end coating material applied to the glass containers while hot, the resultant hot end coating initially being substantially free of objectionable color and imparting abrasion resistance to the glass containers and being altered by repeated washings therein whereby the glass containers exhibit loss of abrasion resistance or an objectionable discoloration appears, the aqueous caustic soda cleaning solution consisting essentially of on a weight basis from 0.3 to 6% of caustic soda, from 0.01 to 0.3% of at least one soluble zinc containing compound when calculated as zinc oxide, from 0.002 to 0.05% of at least one synthetic organic phosphate ester anionic surfactant, from 0.001 to 0.03% of at least one low foaming synthetic alkoxylated nonionic surfactant, from 0.008 to 0.2% of at least one hard water conditioning sequesterant which sequesters calcium ion or magnesium ion from hard water containing the same, and the remainer water, the said aqueous caustic soda cleaning solution being effective to prolong the useful life of the said hot end coating including the coating of the organic hot end coating material.

4,017,411

BLEACHING ARTICLES

Francis Louvaine Diehl, Wyoming; Mario Stephen Marsan, and James Byrd Edwards, both of Cincinnati, all of Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio

Filed Mar. 27, 1975, Ser. No. 562,527
Int. Cl.[2] D06L 3/02; C11D 3/395
U.S. Cl. 252—186 6 Claims

1. An article especially adapted for bleaching fabrics in an automatic dryer, comprising:

a. a non-starch thickened peroxygen bleaching composition characterized by a viscosity of from 200 cps to 100,000 cps; and

b. a water-insoluble dispensing means characterized by being in the form of a pouch having perforations of a diameter from about 0.05 mm to about 3 mm or embossed in such a manner that upon rupture perforations are formed having a diameter of from about 0.05 mm to about 3 mm,

wherein said bleaching composition is in releasable combination with the dispensing means.

4,017,412
BLEACHING COMPOSITION

William Jack Bradley, Cincinnati, Ohio, assignor to The Procter & Gamble Company, Cincinnati, Ohio

Filed Mar. 27, 1975, Ser. No. 562,531

Int. Cl.² D06L *3/02*; C11D *3/395*

U.S. Cl. 252—186 **11 Claims**

1. A fabric bleaching composition having a viscosity of from about 200 cps to about 100,000 cps, comprising:

a. from about 5% to about 35% by weight of a solid, substantially water-insoluble peroxygen compound selected from the group consisting of diperazelaic acid, diperbrassylic acid, dipersebacic acid, and diperisophthalic acid;

b. an effective amount of a starch thickening agent; and

c. the balance a liquid carrier.

4,017,413
PROCESS FOR THE PRODUCTION OF SOLUTIONS OR SUSPENSIONS OF CYANURIC CHLORIDE IN AQUEOUS ORGANIC SOLVENTS

Friedrich Bittner, Bad Soden, Germany; Heinz Haschke, Weissenstein ob der Drau, Austria; Helmut Suchsland, Rodenbach, Germany; Gerd Schreyer, Hanau, Germany, and Werner Schwarze, Frankfurt, Germany, assignors to Deutsche Gold- und Silber-Scheideanstalt vormals Roessler, Frankfurt, Germany

Filed Nov. 18, 1975, Ser. No. 632,952

Claims priority, application Germany, Nov. 20, 1974, 2454910

Int. Cl.² B01F *3/08*; C07D *251/28*

U.S. Cl. 252—187 R **14 Claims**

1. A process for the production of a solution or suspension of cyanuric chloride in a water containing organic solvent comprising mixing liquid cyanuric chloride and the organic-aqueous solvent while they are agitated, said process including leading the liquid 200°chloride at a temperature between its melting point and 200° C. into the flowing organic-aqueous solvent, the cyanuric chloride having a velocity

Vcy in kg/hr where

$$Vcy = \frac{P - P_{LM}}{100 - P} \times V_{LM}$$

where

P is the desired concentration of cyanuric chloride in said solution or suspension,

P_{LM} is the concentration of cyanuric chloride in the solvent, V_{LM}

V_{LM} is the velocity of the added solvent in kg/h, and

P_{LM}, V_{LM}, the temperature of the added solvent are so selected that the equation

$$T_s = \frac{T_{LM} + \frac{V_{CY}}{V_{LM}} \times \frac{C_p(Cy)}{C_p(LM)} \times T_{Cy}}{1 + \frac{V_{CY}}{V_{LM}} \times \frac{C_p(Cy)}{C_p(LM)}}$$

does not exceed the boiling point in ° C. of the solvent and wherein $C_p(LM)$ and $C_p(Cy)$ indicate the specific heat capacities in cal. ×g ⁻× degree C^{-1} of the solvent and cyanuric chloride respectively.

4,017,414
POWDERED METAL SOURCE FOR PRODUCTION OF HEAT AND HYDROGEN GAS

Stanley A. Black, Port Hueneme, and James F. Jenkins, Camarillo, both of Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Division of Ser. No. 507,652, Oct. 19, 1974, Pat. No. 3,942,511. This application Dec. 8, 1975, Ser. No. 635,009

Int. Cl.² C09K *3/00*

U.S. Cl. 252—188 **14 Claims**

1. An electrochemical source for the rapid generation of heat and hydrogen gas upon activation by electrolyte, comprising:

a. an intimate mixture of powdered active magnesium metal particles and passive metallic iron particles such that the electrical contact resistance between said active and passive powdered metal particles is very low;

b. passive metallic iron particles being embedded in the surface of at least a substantial portion of said active magnesium metal particles; each said active magnesium metal particle having at least one passive metal particle embedded thereon comprises a powdered form of a shorted micro electrochemical cell; said intimate mixture of powdered active and passive metal particles operable to produce heat and hydrogen by exothermic reaction in a suitable electrolyte;

c. an electrolyte in which the exothermic reaction occurs when in solution, the electrolyte solution being kept separate from the metal containing particles until the reaction is desired;

d. controls for the amount of heat and hydrogen produced and the operational life of said intimate mixture in the electrolyte being the variation of powder sizes and the ratio of active to passive metal surface area exposed.

4,017,415
PROCESS FOR THE RESTORATION OF THE CHEMICAL LIGHTING POTENTIAL OF A CHEMILUMINESCENT LIGHTING FORMULATION

Arthur Albert Doering, Middlesex, N.J., assignor to American Cyanamid Company, Stamford, Conn.

Filed May 29, 1975, Ser. No. 582,037

Int. Cl.² C09K *3/00*; A61L *13/00*; C09K *11/06*

U.S. Cl. 252—188.3 CL **5 Claims**

1. An improved method of treatment for oxalate component solution useful in a chemical light system, said oxalate component solution comprising an oxalate diester in liquid solution, and said component prior to treatment having a characteristic failure to produce initial high intensity luminosity on mixture with liquid activator component comprising peroxide and basic catalyst in liquid solvent, said improved method comprising the steps of contacting the defined liquid oxalate component with solid aluminum oxide for a period of time sufficient to correct the defined characteristic failure and then separating the treated liquid from the solid.

4,017,416

P-CYANOPHENYL 4-ALKYL-4'-BIPHENYLCARBOXYLATE, METHOD FOR PREPARING SAME AND LIQUID CRYSTAL COMPOSITIONS USING SAME

Takashi Inukai; Hideo Sato; Shigeru Sugimori, and Tetsuya Ishibe, all of Yokohamashi, Japan, assignors to Chisso Corporation, Osaka, Japan

Filed Oct. 3, 1975, Ser. No. 619,539

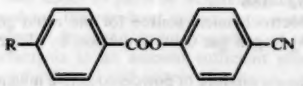
Claims priority, application Japan, Oct. 11, 1974, 49-116928; Apr. 12, 1975, 50-44496

Int. Cl.² C09K *3/34*; G02F *1/13*

U.S. Cl. 252—299 **2 Claims**

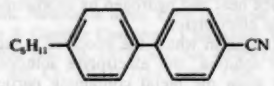
1. A liquid crystal composition comprising the following 4 groups of (A)–(D) in the proportions specified:

A. 35–50% by mol, based upon the total amount of the composition, of two or three compounds selected from the group consisting of 4-alkylbenzoic acid-4'-cyanophenyl esters expressed by the general formula



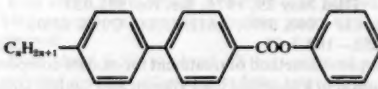
(wherein R is a straight chain alkyl group having 4–8 carbon atoms or a straight chain alkoxy group having 5–8 carbon atoms), said two or at least two of said three compounds each having R as a straight chain alkyl group,

B. 20–30% by mol, based upon the total amount of the composition, of



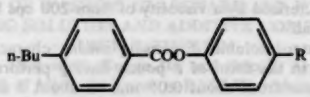
or a mixture thereof with

C. 8–13% by mol, based upon the total amount of the composition, of one or two or more of compounds selected from the group consisting of 4-alkylbiphenylcarboxylic acid-4'-cyanobiphenyls expressed by the general formula

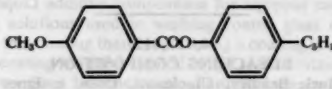


-(wherein C_nH_{2n+1} is a straight chain alkyl group having 4–8 carbon atoms or a methyl branched alkyl group having 5–7 carbon atoms, and

D. 15–30% by mol, based upon the total amount of the composition, of one or more compounds selected from the group consisting of 4-n-butylbenzoic acid-4'-alkyl esters (wherein R is n-heptyl group, n-hexyloxy group or n-heptyloxy group) expressed by the general formula



and 4-anisic acid-4'-n-pentylphenyl ester having a formula of



alone or in admixture with said one or more compounds selected from the group consisting of the above 4-n-butylbenzoic acid-4'-alkyl esters.

4,017,417

IMMOBILIZATION OF IODINE IN CONCRETE

Walter E. Clark, and Clarence T. Thompson, both of Oak Ridge, Tenn., assignors to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed July 30, 1976, Ser. No. 710,087

Int. Cl.² G21F *9/16*

U.S. Cl. 252—301.1 W **10 Claims**

1. A method for immobilizing fission product radioactive iodine recovered from irradiated nuclear reactor fuel, said method comprising forming a fluid mixture comprising water, Portland cement, and about 3–20 wt. % iodine as $Ba(IO_3)_2$and allowing the fluid mixture to harden, said radioactive iodine being present in the form of $Ba(IO_3)_2$.

4,017,418

PROCESS FOR MAKING COLLOIDAL SOLS OF ANTIMONY PENTOXIDE IN POLAR ORGANIC SOLVENTS

Charles Edward Crompton, Arlington Heights, Ill., and Abdulla M. Z. Kazi, Euclid, Ohio, assignors to Chemetron Corporation, Chicago, Ill.

Filed Aug. 18, 1975, Ser. No. 605,606

Int. Cl.² B01J *13/00*

U.S. Cl. 252—309 **6 Claims**

1. A process for making a colloidal dispersion of hydrous antimony pentoxide particles comprising introducing particles of antimony trioxide into a polar organic solvent selected from the group consisting of formamide, methylformamide, dimethyl formamide, acetamide, methylacetamide, dimethylacetamide, dimethyl sulfoxide, formic acid, tetramethyl urea, methanol and ethanol and contacting said particles with aqueous hydrogen peroxide in the presence of an aliphatic alpha-hydroxy carboxylic acid, and a halogen acid selected from the group consisting of hydrogen chloride and hydrogen bromide, at a temperature of from about 0° C to about the decomposition temperature of the reaction mixture for a length of time sufficient to convert at least a portion of the antimony particles to colloidal particles of hydrous antimony pentoxide.

4,017,419

CATIONIC BITUMINOUS EMULSIONS

Charles H. Ludwig, Bellingham, and Larry B. Fiske, Everson, both of Wash., assignors to Georgia-Pacific Corporation, Portland, Oreg.

Filed Jan. 2, 1976, Ser. No. 646,372

Int. Cl.² B01J *13/00*

U.S. Cl. 252—311.5 **16 Claims**

1. In a cationic bitumen emulsion wherein from 30 to about 75% by weight of bitumen is dispersed in an aqueous continu-

ous phase using a cationic, water-soluble aliphatic amine salt or quaternary ammonium salt emulsifier, the improvement which comprises a lignin-polyamine reaction product being present in a sufficient amount to stabilize the set time of the emulsion in presence of negatively charged aggregate, said lignin-polyamine reaction product being a lignin heated under alkaline conditions at a pH of at least 10, with from 8 to 35 percent by weight of a water-soluble, aliphatic polyamine at a temperature of at least 100° C until sufficient amount of amine has reacted with the lignin for the reaction product to form aqueous solutions with the emulsifier under acid conditions, said lignin being soluble in an aqueous alkaline medium said polyamine containing at least one primary or secondary amine group and said polyamine having a molecular weight of from about 60 to 300 and containing from 20 to 47 percent organically bound amino-type nitrogen with only one amino-type nitrogen atom being attached to a particular carbon atom and said amino-type nitrogen being the only functional substituent on said carbon atom.

4,017,420
STABLE OXIDASE REAGENT SOLUTIONS

Betty Anne Bowie, Havertown, and Joseph F. Pagano, Paoli, both of Pa., assignors to SmithKline Corporation, Philadelphia, Pa.

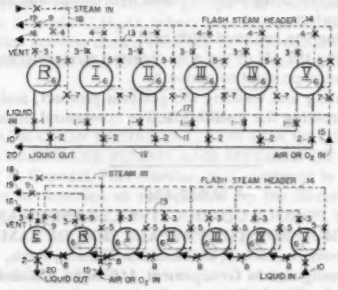
Filed Dec. 22, 1975, Ser. No. 643,465
Int. Cl.² C09K *3/00*
U.S. Cl. 252—408 **4 Claims**

1. A stable oxidase reagent solution for detection of microbial colonies comprising from about 0.1% to about 1.0% by weight of N,N,N′,N′-tetramethyl-p-phenylenediamine or N,N-dimethyl-p-phenylenediamine in dimethyl sulfoxide or acid addition salts thereof.

4,017,421
WET COMBUSTION PROCESS

Donald F. Othmer, 333 Jay St., Brooklyn, N.Y. 11201

Filed Dec. 16, 1975, Ser. No. 641,335
Int. Cl.² B01D *15/06, 1/14*
U.S. Cl. 252—416 **40 Claims**



1. In a process of heating, reacting with an added material, flash evaporating, and condensing vapors so formed of individual batches of an original aqueous liquid wherein there is no mechanical pumping of said liquid during the processing cycle, the steps comprising:

a. arranging in the order of decreasing temperature a series of batches of said original aqueous liquor, each batch being preheated in one of a series of heat transfer vessels;

b. supplying heat to heat further at least a major part of the batch of said liquid of the heat transfer vessel which has been preheated to highest temperature, so that this batch is raised to an even higher temperature, the maximum temperature in the process, and said batch becomes the hottest batch of liquid in the process;

c. contacting said hottest batch with an added material which at said maximum temperature changes the concentration of at least some of the components of the liquid in said hottest batch;

d. subjecting said hottest batch of liquid, with the concentration of at least some of its components changed, successively to a series of as many individual and separate flash evaporations as there are heat transfer vessels exclusive of the vessel containing said hottest liquid, the first of which individual flash evaporations generates an amount of steam at the highest temperature of any of said flash evaporations; and each successive flash evaporation generates an amount of steam of a successively lower temperature;

e. condensing said amount of steam of highest temperature which is generated by said flash evaporation in the condensing zone of the heat transfer vessel of the next highest temperature below said maximum temperature so as to preheat the batch of liquid therein, and condensing said steam generated in each successive flash evaporation at each successively lower temperature in the condensing zone of the heat transfer vessel taken serially in the order of successively lower temperatures, until the steam generated at the lowest temperature condenses to preheat the batch of raw original liquid which is at the lowest temperature of the process;

f. cooling by each of said individual flash evaporation said liquid of what had been the hottest batch, so that after each of said flash evaporations, its temperature approaches the temperature of the liquid of the batch in the heat transfer vessel wherein was condensed the steam of this particular flash evaporation; and

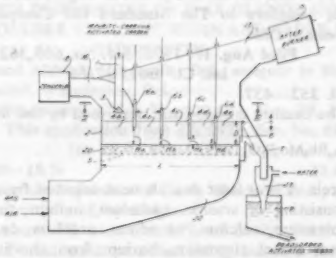
g. continuing said cooling of said liquid of what had been the hottest batch until its temperature approaches that of the batch of lowest temperature which was the one last charged with the original liquid.

11. In a process according to claim 1 wherein said original liquid contains particulate solids which when activated adsorb organic material and said contacting comprises adding oxygen to said activated particulate solids while carried in said original liquid, said particulate solids containing oxidizable organic material adsorbed thereon; so as to produce a controlled wet combustion of the adsorbed oxidizable organic material but not of said particulate solids, thereby reactivating said particulate solids so that they will again adsorb organic material.

4,017,422
METHOD AND APPARATUS FOR REGENERATING ABSORPTION PARTICLES

Günther Gappa, Gelsenkirchen-Buer; Harald Jüntgen, and Jurgen Klein, both of Essen, all of Germany, assignors to Bergwerksverband GmbH, Essen, Germany

Filed Feb. 12, 1976, Ser. No. 657,406
Claims priority, application Germany, Feb. 15, 1975, 2506394; May 2, 1975, 2519669
Int. Cl.² B01D *53/34, 15/06*
U.S. Cl. 252—417 **8 Claims**



1. An apparatus for regenerating an adsorption agent, said apparatus comprising: an upper elongated reaction chamber

having an upper foraminous floor and adapted to hold an upper bed of said agent; a vertically displaceable upper baffle in said upper chamber extending down into said upper bed and subdividing same longitudinally into an upstream bed and a downstream bed communicating therewith; a lower elongated reaction chamber under said upper chamber having a lower foraminous floor and adapted to hold a lower bed of said agent, each of said chambers having a length at least twice as great as the respective width; a plurality of vertically displaceable lower baffles in said lower chamber extending down into said lower bed and subdividing same longitudinally into a succession of communicating downstream beds; means including an overflow weir in said downstream bed of said upper chamber for conducting particles from said downstream bed of said upper chamber into the downstream bed at one end of said chamber, said lower baffles having respective lower edges spaced from said lower floor by distances decreasing from said one end; means for feeding particles into said upstream bed to create a flow therefrom into the downstream bed of said upper chamber and thence down and sequentially through the downstream beds of said lower chamber; means for withdrawing particles from the downstream bed at the other end of said lower chamber; means for passing a hot gas up throughsaid lower bed to fluidize same and thence through said upper bed to fluidize same; means connected to said upper chamber for collecting and condensing gases rising from said upstream bed; and means connected to both said chambers for collecting and afterburning gases rising from said downstream beds.

7. A method of regenerating adsorption particles, said method comprising the steps of:

introducing said particles into an upstream compartment to form an upstream bed therein;

passing said particles from said upstream bed through an upstream restriction into the first of a succession of downstream compartments to form a downstream bed therein;

subdividing said downstream compartments from each other with a plurality of downstream restrictions of size decreasing from said first downstream compartment and passing said particles from said first downstream compartment through said restrictions to the last downstream compartment;

withdrawing particles from said last downstream compartment at substantially the same rate said particles pass through said upstream restriction into said first downstream compartment;

flowing a hot gas up through said particles in all of said compartments to fluidize said beds;

collecting and condensing the gas rising from said upstream bed; and

collecting and afterburning all the gas rising from said downstream bed, whereby impurities adsorbing into said particles are carried off by the gases rising from said beds.

4,017,423

PROCESS FOR THE PREPARATION OF UNSATURATED ACIDS FROM UNSATURATED ALDEHYDES

James F. White, Akron, and James R. Rege, Lakewood, both of Ohio, assignors to The Standard Oil Company (Ohio), Cleveland, Ohio

Filed Aug. 18, 1975, Ser. No. 605,362
Int. Cl.² B01J *27/14*
U.S. Cl. 252—437 **8 Claims**

1. The catalyst composition described by the formula

$$A_aRb_bMo_3P_cO_x$$

wherein A is at least one element selected from the group consisting of arsenic, cadmium, indium, tin, thallium, potassium, calcium, vanadium, uranium, cerium, tungsten, nickel, zirconium, barium, iron, rhodium, manganese, rhenium, ruthenium, cobalt, and copper.

and wherein

a is a positive number less than about 20;

b is about 0.01 to about 3;

c is a positive number less than about 2;

x is the number of oxygens required by the valence states of the other elements present

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4,017,424

HYDROCARBON STEAM REFORMING AND METHANATION CATALYSTS

Marvin M. Johnson, and Gerhard P. Nowack, both of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed Oct. 1, 1975, Ser. No. 618,722
Int. Cl.² B01J *27/14, 23/64*
U.S. Cl. 252—437 **11 Claims**

1. A catalyst composition consisting essentially of nickel, a metal selected from the group consisting of barium and uranium, combined oxygen and a calcium phosphate support having a Ca:P atomic ratio in the range of 1.4:1 to 2.3:1, wherein the compounds are present in approximate amounts, as follows:

Calcium	5 to 35,
Phosphorus	2 to 20,
Nickel	10 to 50, and either
Barium	1 to 20, or
Uranium	2 to 40,

all said amounts expressed in terms of weight percent, based upon the weight of the total catalyst.

4,017,425

METHOD OF ACTIVATION OF RED MUD

Shing-Jen Shiao, 48-18, 2-chome, Eifuku, Suginami, Tokyo, Japan

Filed Nov. 10, 1972, Ser. No. 305,433
Int. Cl.² B01J *37/02, 29/06*
U.S. Cl. 252—453 **10 Claims**

1. Activated red mud for allowing its use as adsorbent, catalyst, clarifying substance and ion-exchanging substance is made from red mud of Bayer process by method comprising digesting red mud and dispersing the metal oxide compound particales in the compound of metal hydroxides and silica gel which comprises;

a. digesting the red mud with acid,

b. adjusting the pH of the acid digested mixture comprising the sludge product to above 4,

c. separating and washing the gelation product, and,

d. heat treating the resulting active compound under 800° C.

4,017,426

HIGHLY POROUS CONDUCTIVE CERAMICS AND A METHOD FOR THE PREPARATION OF SAME

Henri Carbonnel, Antony, and Ludovic Hamon, Paris, both of France, assignors to Groupement Atomique Alsacienne Atlantique, Le Plessis Robinson, France

Continuation of Ser. No. 317,562, Dec. 22, 1972, abandoned. This application Dec. 2, 1974, Ser. No. 529,420
Claims priority, application France, Dec. 22, 1971, 71.46212
Int. Cl.² H01B *1/06*
U.S. Cl. 252—520 **2 Claims**

1. A porous electrically conductive molded ceramic product comprising more than 20% but no more than 80% by weight of grains Of a few millimeters in diameter comprising a diboride of one of, and of 0-25% of a disilicide of one of, the group of metals consisting of titanium, zirconium, hafnium, and tungsten, uniformly dispersed within less than 80% but no less than 20% by weight of a homogeneous sintered powder, said powder particles having a diameter of a few microns and comprising a mixture of a diboride of one of, and a disilicide

of one of, the group of metals consisting of titanium, zirconium, hafnium and tungsten, said porous electrically conductive ceramic having a porosity greater than 30%.

4,017,427

FAST COOLING STYRENE POLYMER FOAMS

Jose E. Granda, Aliquippa, Pa.; John J. Quinlan, Atco, N.J., and James J. Garland, Aliquippa, Pa., assignors to ARCO Polymers, Inc., Philadelphia, Pa.

Filed May 30, 1975, Ser. No. 582,332
Int. Cl.² C08F *112/08, 212/08;* C08J *9/04, 9/06*
U.S. Cl. 260—2.5 B 12 Claims

1. Method of making foamable styrene polymer particles which yield a fast cooling foamed molding comprising the steps of:

a. suspending styrene polymer particles in water with the aid of a suspending agent system;

b. adding 3 to 20 weight percent of a blowing agent and 0.05 to 0.4 weight percent of a silicone surfactant selected from the siloxane-oxyalkylene copolymers having (1) at least one polysiloxane block which contains mers of the general formula R_2SiO where R is selected from the group consisting of alkyl having 1 to 4 carbon atoms and halogenated alkyl having 1 to 4 carbon atoms, and (2) at least one polyoxyalkylene block attached to said polysiloxane block, and terminated by hydroxyl groups, and containing mers of general formula $C_nH_{2n}O$, where *n* is 2, 3 or 4;

c. heating the suspension at a temperature of from 80° to 150° C. to impregnate the polymer particles;

and

d. separating the impregnated particles from the aqueous system.

7. A composition consisting essentially of particles of a styrene polymer containing dispersed throughout 3 to 20 weight percent of a blowing agent and 0.05 to 0.4 **weight percent of a silicone surfactant, said surfactant being dispersed by impregnation into the polymer with the blowing agent, and said surfactant being a siloxane-oxyalkylene copolymer having** (1) at least one polysiloxane block which contains mers of the general formula R_2SiO where R is selected from the group consisting of alkyl having 1 to 4 carbon atoms and halogenated alkyl having 1 to 4 carbon atoms, and (2) at least one polyoxyalkylene block attached to said polysiloxane block, and terminated by hydroxyl groups and containing mers of general formula $C_nH_{2n}O$, where *n* is 2,3, or 4; said particles being fast cooling during molding in thick-section billets that are greater than one foot in the smallest dimension.

4,017,428

ABRASION RESISTANT, NON-DISCOLORING POLYURETHANE FOAMS AND METHOD OF MAKING

Gerald A. Capocci, Port Chester, N.Y., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed June 10, 1975, Ser. No. 585,536
Int. Cl.² C08J *9/00*
U.S. Cl. 260—2.5 AM 10 Claims

1. A process for producing a predominantly open celled, polyurethane foam having a density of from about 30 to about 50 pounds per cubic foot and a high abrasion index by reacting and foaming at a reaction temperature maintained below about 140° F. a reaction mixture comprising:

a. a polyether diol having a molecular weight of about 2000;

b. a polyurethane-forming agent selected from the group consisting of a cycloaliphatic diisocyanate, a prepolymer of a polyether diol having a molecular weight of about 2000 and a cycloaliphatic diisocyanate, and mixtures of the foregoing polyurethane-forming agents;

c. a curing agent selected from the group consisting of 1,4 butanediol and trimethylol propane;

d. from about 0.15 to about 0.24 percent by weight of water;

e. a surfactant; and

f. a catalyst for the polyurethane-forming reaction;

said polyether diol and said polyurethane-forming agent, taken together, being present in the reaction mixture in a major amount and in relative amounts required to produce said polyurethane foam.

4,017,429

PREPARATION OF 2-HYDROXYALKYL ESTERS

Roger B. Steele, Fair Oaks, and Arthur Katzakian, Jr., Sacramento, both of Calif., assignors to Aerojet-General Corporation, El Monte, Calif.

Division of Ser. No. 389,079, Aug. 17, 1973, abandoned, which is a continuation-in-part of Ser. No. 4,056, Jan. 19, 1970, Pat. No. 3,968,135. This application Jan. 14, 1975, Ser. No. 540,776
Int. Cl.² C08F *2/00*
U.S. Cl. 260—2 EP 15 Claims

1. A method of forming as ester linkage which comprises reacting an organic carboxylic acid with an organic oxirane compound in the presence of an effective catalytic amount of soluble chromium III carboxylate of the formula:

$$Cr(OOCR^a)_3$$

where $OOCR^a$ is a carboxylate group containing at least 4 carbon atoms, said catalyst being the reaction product of a hydrated Cr III tricarboxylate heated in an excess of organic acid to a temperature above 140° C and said reaction product having the following characteristics:

1. emerald green in color;
2. slightly soluble in hexane but fully soluble in acetone;
3. melts slightly above room temperature;
4. does not exhibit a water absorption peak at 2750 mμ in the near infrared
5. at least 90% of the carboxylate carbonyl absorption is at 1615 cm^{-1} and not at 1540 cm^{-1}.

4,017,430

COATING COMPOSITION

William Scott Briggs, Bellingham, Wash., assignor to Georgia-Pacific Corporation, Portland, Oreg.

Filed June 23, 1975, Ser. No. 589,456
Int. Cl.² C08H *5/02;* C08L *97/00*
U.S. Cl. 260—17.5 18 Claims

1. A coating composition comprising a reaction product of a polyunsaturated carboxylic acid having from 5 to 22 carbon atoms and a phenolated-lignosulfonate, said carboxylic acid being reacted with the phenolated-lignosulfonate until a substantial proportion of the carboxyl groups of the acid has reacted with the phenolic hydroxyl groups of the phenolated-lignosulfonate, said phenolated-lignosulfonate being obtained by reacting a phenol with the lignosulfonate in an amount of at least 15 weight percent, based upon lignosulfonate solids.

4,017,431

AQUEOUS DISPERSIONS OF WAX BLENDS AND A WATER-SOLUBLE CATIONIC RESIN AND PAPER SIZED THEREWITH

Paul Harwood Aldrich, Greenville, Del., assignor to Hercules Incorporated, Wilmington, Del.

Continuation-in-part of Ser. No. 420,191, Nov. 28, 1973, abandoned. This application June 17, 1976, Ser. No. 697,008
Int. Cl.² C08L *91/06*
U.S. Cl. 260—18 N 20 Claims

1. An aqueous dispersion of finely divided solid particles consisting essentially of, by weight

A. from about 5% to about 50% of finely divided solid particles, said solid particles being selected from the group consisting of

1. a blend consisting essentially of, by weight, from about 99% to about 93% of a wax selected from the group consisting of petroleum waxes, synthetic hydrocarbon

waxes, and mixtures thereof and from about 1% to about 7% of a C_{18} to C_{24} saturated fatty acid,

2. a blend consisting essentially, by weight, from about 99.5% to about 75% of a wax selected from the group consisting of petroleum waxes, synthetic hydrocarbon waxes, and mixtures thereof and from about 0.5% to about 25% of at least one alkyl ketene dimer having the formula $[RCH{=}C{=}O]_2$ where R is an alkyl radical having 10 to about 20 carbon atoms, and

3. mixtures of (1) and (2),

B. from about 0.5% to about 20% of water-soluble cationic resin dispersing agent selected from the group consisting of

i. a water-soluble polyaminopolyamide—epichlorohydrin resin,

ii. a water-soluble alkylenepolyamine—epichlorohydrin resin,

iii. a water-soluble poly(diallylamine)—epichlorohydrin resin, and

iv. mixtures of any two or more of (i), (ii), and (iii), and

C. water to 100%.

4,017,432

POLYEPOXIDE COMPOSITIONS EXHIBITING IMPROVED PHYSICAL PROPERTIES

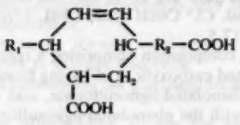
James E. Carey, Mullica Hill, N.J., assignor to Shell Oil Company, Houston, Tex.

Continuation-in-part of Ser. No. 623,521, Oct. 17, 1975, abandoned. This application Sept. 13, 1976, Ser. No. 722,848

Int. Cl.² C08G *59/14*

U.S. Cl. 260—18 EP **15 Claims**

1. A compatilizable, curable composition comprising (1) a polyepoxide having at least one vicinal epoxy group and (2) a curing amount of a blend of (a) a polymerized fatty acid derived from unsaturated fatty acids having at least 12 carbon atoms in the molecule and (b) a liquid organic polycarboxylic acid of the general formula:



wherein R_1 is an alkyl radical and R_2 is an alkylene radical, the weight ratio of (a) to (b) being from about 1:10 to about 10;1.

4,017,433

PITCH WATER SOLUBLE RESIN AND ALKYD RESIN AS BINDER COMPOSITION FOR REFRACTORY PARTICLES

Grant M. Farrington, Marlton, N.J.; J. Donald Harris, Beamsville, Canada, and Alfred H. Foessel, Baltimore, Md., assignors to General Refractories Company, Bala Cynwyd, Pa.

Division of Ser. No. 413,250, Nov. 6, 1973, Pat. No. 3,903,025. This application May 28, 1975, Ser. No. 581,656

Int. Cl.² C08L *61/24, 67/08, 95/00, 75/00*

U.S. Cl. 260—17.5 **11 Claims**

1. A binder composition for binding refractory particles comprising:

a. 10% to 40% by weight pitch;

b. 25% to 80% by weight of an aqueous solution containing from 40% to 60% by weight of a water soluble ammonium or metal lignosulfonate or urea formaldehyde resin; and

c. 10% to 35% by weight of an organic solvent solution containing from 60% to 100% by weight of an alkyd resin.

4,017,434

DIALLYL PHTHALATE RESIN-CONTAINING AQUEOUS EMULSIONS

Akio Suzui, Amagasaki; Shinji Nose, Kobe; Takashi Kodama, Matsuyama; Kenji Yokoyama, Amagasaki; Kazuya Matsumoto, Kobe, and Yoshiharu Fujio, Amagasaki, all of Japan, assignors to Osaka Soda Co., Ltd., Osaka, Japan

Division of Ser. No. 488,926, July 16, 1974, Pat. No. 3,963,661. This application Dec. 1, 1975, Ser. No. 636,561

Claims priority, application Japan, May 31, 1974, 49-62406

Int. Cl.² C08L *31/08*

U.S. Cl. 260—21 **6 Claims**

1. A diallyl phthalate resin-containing aqueous emulsion product containing:

A. an aqueous emulsion of a diallyl phthalate resin having a degree of conversion of monomer to polymer of from 30 to 75 weight percent, said diallyl phthalate resin consisting of

1. diallyl phthalate present in from 50 to 100 weight percent, and

2. an alkyl acrylate present in from 50 to 0 weight percent; and

B. an aqueous emulsion of a thermosetting vinyl resin consisting of a copolymer of

1. a vinyl compound present in from 10 to 1 weight percent and containing a thermosetting functional moiety selected from the group consisting of glycidyl, N-methylol, N-alkoxy-methyl, carboxyl, hydroxyl, amino, and amide, and

2. a vinyl compound present in from 90 to 99 weight percent and not containing a thermosetting functional moiety and selected from the group consisting of C_{1-8} alkyl esters of α,β-unsaturated carboxylic acid, vinyl esters, aromatic vinyl compounds, and α,β-unsaturated nitriles,

said product containing from 10 to 70 weight percent of the resin of A) and from 90 to 30 weight percent of the resin of B), based on the total resin content of A) and B), and further containing a cross-linking agent for the resin of B) present in from about 10 to about 100 parts by weight per 100 parts by weight of B).

4,017,435

POWDER COATING COMPOSITION FOR ELECTRODEPOSITION

Taizo Kondo; Komaharu Matsui, and Kunio Yamamoto, all of Hiratsuka, Japan, assignors to Kansai Paint Company, Ltd., Japan

Division of Ser. No. 465,078, April 29, 1974, Pat. No. 3,960,791, which is a division of Ser. No. 211,660, Dec. 23, 1971, abandoned. This application Dec. 22, 1975, Ser. No. 643,161

Claims priority, application Japan, Dec. 26, 1970, 45-118724

Int. Cl.² C08L *33/06;* C25D *13/06, 13/10*

U.S. Cl. 260—22 A **9 Claims**

1. A powder coating composition for electrodeposition which comprises powdery particles of a polyester resin powder coating composition having 0.1–50 microns particle size wet with an organic liquid which does not dissolve the powdery particles and is nearly insoluble in an aqueous medium and which has a boiling point of 50°–250° C. in the range of 5–100 parts by weight per 100 parts by weight of the powdery particles, said wet powdery particles dispersed in an aqueous medium containing 0.05–5 parts by weight per 100 parts by weight of the powdery particles of a surface active agent.

4,017,436
THERMOPLASTIC RESIN COMPOSITION

Minoru Tabana, Suita; Tatsuyuki Mitsuno, Toyonaka, and Hiroshi Maki, Takatsuki, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

Filed Sept. 2, 1975, Ser. No. 609,894
Claims priority, application Japan, Sept. 5, 1974, 49-102804
Int. Cl.² C08K 5/01; C08L 93/04
U.S. Cl. 260—27 BB 8 Claims

1. A resin composition consisting essentially of

a. a styrene-butadiene block copolymer resin represented by the formula,

$$A_1 - B_1 - C - B_2 - A_2$$

wherein A_1 and A_2 are non-elastomeric blocks comprising a styrene polymer chain; B_1 and B_2 are elastomeric blocks comprising a random copolymer chain in which styrene and butadiene have uniformly been distributed; C is an elastomeric block comprising a butadiene homopolymer chain or a styrene-butadiene copolymer chain; the proportion of the sum of A_1 and A_2 in the block copolymer is 40 to 80 weight %; the proportion of the sum of B_1 and B_2 in the block copolymer is 10 to 60 weight %; the proportion of C in the block copolymer is 0 to 25 weight % and is always smaller than the proportion of the sum of B_1 and B_2; the weight ratio of A_1 to A_2 is in the range from 2:8 to 8:2; the weight ratio of B_1 to B_2 is in the range from 0:10 to 10:0; the weight ratio of styrene to butadiene in B_1 and B_2 is in the range from 10:90 to 75:25; and the weight ratio of styrene to butadiene in C is in the range from 0:100 to 10:90,

b. a resin selected from the group consisting of a liquid polybutadiene, a liquid butadiene-styrene copolymer, a maleic anhydride-modified liquid polybutadiene and an epoxidation-modified liquid polybutadiene, and

c. a tackifier, wherein the contents of (a) the styrene-butadiene block copolymer, (b) the resin, and (c) the tackifier are 70 to 94 weight %, 3 to 15 weight % and 3 to 15 weight %, respectively.

4,017,437
EMULSIFIED PHENOL-FORMALDEHYDE RESINS

Ramesh C. Vasishth, Delta, and Pitchaiya Chandramouli, Richmond, both of Canada, assignors to Cor Tech Research Limited, Richmond, Canada

Filed Apr. 14, 1975, Ser. No. 567,881
Int. Cl.² C08L 61/06; C09J 1/00
U.S. Cl. 260—29.3 4 Claims

1. A stable resin-in-water emulsion of a room temperature-stable and mobile thermosetting phenol-formaldehyde resin capable of rapid cure at elevated temperature, formed by reaction of formaldehyde with phenol at a mole ratio of formaldehyde to phenol greater than about 1.7:1 in an aqueous reaction medium in the presence of a metal carboxylate catalyst therefor and acid addition to the resin so formed prior to emulsification, and having a viscosity of about 1,000 to 40,000cps at about 24° C.

4,017,438
KETIMINE-BLOCKED PRIMARY AMINE GROUP-CONTAINING CATIONIC ELECTRODEPOSITABLE RESINS

Robert D. Jerabek, Glenshaw; Joseph R. Marchetti, Greensburg, and Robert R. Zwack, New Kensington, all of Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.

Continuation-in-part of Ser. No. 533,418, Dec. 16, 1974, abandoned, which is a continuation of Ser. No. 400,304, Sept. 24, 1973, abandoned, which is a division of Ser. No. 203,875, Dec. 1, 1971, abandoned. This application Apr. 2, 1976, Ser. No. 672,902
Int. Cl.² C08G 51/24, 30/08
U.S. Cl. 260—29.2 EP 6 Claims

1. An aqueous electrodepositable composition comprising an uncrosslinked acid-neutralized, amine group-containing, synthetic organic resin, wherein said organic resin contains hydroxyl groups curable through urethane group crosslinking, wherein at least a portion of said amine groups are primary amine groups and wherein said organic resin is formed from reacting:

A. a polyepoxide containing 1,2-epoxy functionality,

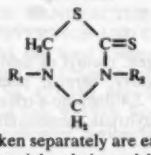
B. a polyamine derivative having at least one primary amine group which is blocked by a ketimine group and having a secondary amine group.

4,017,439
VULCANIZATION OF NEOPRENE

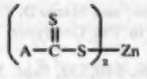
Howard C. Beadle, and Lester A. Brooks, both of Norwalk, Conn., assignors to R. T. Vanderbilt Company, Inc., Norwalk, Conn.

Filed July 31, 1975, Ser. No. 600,680
Int. Cl.² C08F 28/00
U.S. Cl. 260—79.5 B 11 Claims

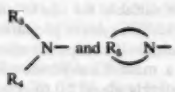
1. A vulcanizable composition comprising a nonsulfur modified neoprene rubber; a metal oxide selected from zinc oxide, magnesium oxide and mixtures thereof; and about 0.25 to 3 phr of an accelerator system comprising a thiadiazine accelerator having the structural formula:



wherein R_1 and R_2 taken separately are each selected from the group consisting of straight chain and branched chain alkyl groups having one to four carbon atoms and a dithiocarbamate secondary accelerator having the structural formula:



wherein A represents the structural units



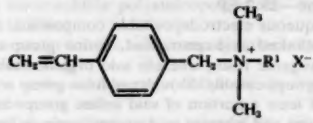
wherein R_3 is selected from straight chain and branched chain alkyl groups having one to four carbon atoms, phenyl, and benzyl groups, R_4 is selected from benzyl and, straight chain and branched chain alkyl groups having one to four carbon atoms, and R_5 is selected from pentamethylene, hexamethylene and 4-oxapentamethylene radicals and the ratio of the thiadiazine to dithiocarbamate is about 0.8 to 0.5 parts by weight to about 0.2 to 0.5 parts by weight.

4,017,440
POLYMERS STABILIZED WITH POLYMERIZABLE VINYLBENZYLTRIALKYL AMMONIUM SALT SURFACTANT

H. Scott Killam, Holland, Pa., assignor to Rohm and Haas Company, Philadelphia, Pa.

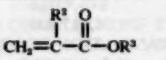
Filed Oct. 10, 1973, Ser. No. 405,221
Int. Cl.² C08F *212/08, 226/00*
U.S. Cl. 260—29.6 HN **6 Claims**

1. An aqueous polymer latex which comprises 0.25 to 5.0% of the total polymer composition of a vinylbenzyltrialkylammonium salt monomer having the formula



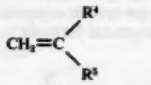
wherein R^1 is alkyl of from 8 to 22 carbon atoms and X^- is an anion, copolymerized with one or more of monomers selected from the following:

a. a monomer of the formula



wherein R^2 is hydrogen or alkyl and R^3 is a straight chain, branched chain or cyclic alkyl, alkoxyalkyl, alkylthioalkyl, ureido, hydroxy lower alkyl, 2,3-epoxypropyl, amino lower alkyl, mono- or di- lower alkylamino, lower alkyl or hydroxyalkyl lower alkylamino lower alkyl or

b. a monomer of the formula



wherein R^4 is hydrogen, methyl or halo and R^5 is hydrogen, halo, lower alkanoyloxy, formyl, phenyl, N-hydroxyethyl, tolyl, methoxyethyl, 2,4-diamino-s-triazinyl, lower alkyl, or epoxy, said vinylbenzyltrialkylammonium salt being the sole surfactant in the latex.

4,017,441
SOAP SOLUTION OF MALEIC ANHYDRIDE-MODIFIED RESIN BACKBONE

James J. Tazuma, Stow, and Mario D. Zadra, Barberton, both of Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio

Division of Ser. No. 510,332, Sept. 30, 1974, Pat. No. 3,929,737. This application Dec. 18, 1975, Ser. No. 642,088
Int. Cl.² C08F *2/24, 255/08, 285/00*
U.S. Cl. 260—29.6 PM **8 Claims**

1. A soap solution suitable for use in an aqueous emulsion free radical polymerization system prepared from 100 parts by weight of soap, which itself comprises about 50 to about 100 parts by weight of a maleic anhydride-modified resin backbone and correspondingly about 50 to about 0 parts by weight of rosin acid, or its sodium or potassium salt, about 0 to about 50 parts by weight of a fatty acid, about 350 to about 450 parts by weight water and mixing therewith a sufficient parts by weight sodium hydroxide or potassium hydroxide in about 200 to about 300 parts by weight water to achieve a final pH of about 8 to about 11, where said modified resin backbone is characterized by having a softening point in the range of about 45° C. to about 100° C., having a basin resin backbone of piperylene and methyl branched monoolefins which comprises about 50 to about 60 mole percent units derived from piperylene and about 20 to about 30 mole percent units derived from monoolefins selected from at least one methyl branched chain α or β monoolefin containing 4 to 6 carbon atoms, where the mole ratio of piperylene to said branched monoolefin is about 0.8/1 to about 2/1, in combination with about 10 to about 30 mole percent units derived from maleic anhydride, based on the total resin composition.

4,017,442
STRUCTURED-PARTICLE LATEXES

Dale S. Gibbs, Midland, Mich.; Earl H. Wagener, Concord, Calif., and Ritchie A. Wessling, Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Filed Apr. 21, 1975, Ser. No. 569,724
Int. Cl.² C08L *33/08*
U.S. Cl. 260—29.6 RB **17 Claims**

1. An aqueous colloidal dispersion of structured particles having activated halogens at or near their surface, said particles consisting of a nonionic, organic polymer core having adhered thereto a thin layer of water-insoluble copolymer of an ethylenically unsaturated, nonionic monomer which is devoid of an activated-halogen and a nonionic emulsion polymerizable, oil-soluble, ethylenically unsaturated, activated-halogen monomer which does not inhibit free-radical polymerization, can diffuse through an aqueous medium and does not hydrolyze readily in such aqueous medium; said thin layer having a thickness of from a monomolecular layer to about 100 Angstroms; the amount of said activated-halogen monomer copolymerized in the thin layer ranging from about 0.01 milliequivalent to about 1.4 milliequivalent per gram of particles in the dispersion and not more than 3.0 milliequivalents for each gram of copolymer in the thin layer; said dispersion being stabilized by a small, stabilizing amount up to about 0.25 milliequivalent per gram of structured particles of a cationic surfactant or blend of cationic and nonionic surfactants.

4,017,443
COATING COMPOSITIONS CONTAINING AS BINDER AQUEOUS POLYMER DISPERSIONS

Ulrich Türck, and Heinz Tetzner, both of Marl, Germany, assignors to Chemische Werke Huls Aktiengesellschaft, Marl, Germany

Filed Aug. 7, 1975, Ser. No. 602,803
Claims priority, application Germany, Aug. 8, 1974, 2438151
Int. Cl.² C08L *9/08*
U.S. Cl. 260—29.6 T **10 Claims**

1. An aqueous coating composition whose binder consists essentially of an aqueous dispersion of a polymer produced from a mixture of monomers consisting of, by weight,

a. 35–70% of styrene, a substituted styrene or mixture thereof;

b. 30–65% of a fumaric acid diester of 3–6 carbon atoms, in the alcohol component;

c. 0–15% of butadiene, a substituted butadiene or mixture thereof;

d. 0–3% of an α,β-unsaturated carboxylic acid; and

e. 0.2–2% of an amide of an α,β-unsaturated carboxylic acid.

4,017,444
PROCESS FOR STABILIZING THE VISCOSITY OF POLYVINYL ACETALS USING A BUFFER

George E. Mont, Springfield, and James A. Snelgrove, Monson, both of Mass., assignors to Monsanto Company, St. Louis, Mo.

Filed Aug. 13, 1975, Ser. No. 604,271
Int. Cl.² C08L *29/14*
U.S. Cl. 260—29.6 H **16 Claims**

1. A process for stabilizing the viscosity of polyvinyl acetal resins which process comprises incorporating into the polyvi-

nyl acetal resin an effective amount of a buffer, which when prepared as an aqueous solution has a pH in the range of from 3 to 7, wherein the buffer is incorporated into the resin prior to fabricating the resin into a shaped article in order to minimize changes in the viscosity of the polyvinyl acetal resin, wherein at least one component of the buffer is at least a bidentate ligand with the ability to interact with a metal to form a chelated ring structure and wherein the buffer is substantially free from hydrochloric, nitric and sulfuric acid components.

4,017,445

PROCESS FOR THE REMOVAL OF VINYL CHLORIDE FROM POLYVINYL CHLORIDE DISPERSIONS

Hans Grosse-Wortmann; Bernhard Hentschel, both of Marl; Peter Rauth, Bochum; Karl-Heinz Schoenberg, Marl; Bernd Terwiesch, Marl, and Hermann Winter, Marl, all of Germany, assignors to Chemische Werke Huls Aktiengesellschaft, Marl, Germany

Filed Aug. 28, 1975, Ser. No. 608,791

Claims priority, application Germany, Aug. 29, 1974, 2441303; Sept. 7, 1974, 2442931

Int. Cl.² C08L *27/06*

U.S. Cl. 260—29.6 R **9 Claims**

1. In a process for the removal with steam of unreacted vinyl chloride, from aqueous polyvinyl chloride dispersions obtained by suspension or emulsion polymerizations of vinyl chloride, to residual monomer contents of less than 50 p.p.m., the improvement which comprises withdrawing steam and vinyl chloride contained in a boiling aqueous polyvinyl chloride dispersion maintained at a temperature of 80°–100° C., at a vaporization rate per minute of 0.006–0.2 kg steam per kg of polyvinyl chloride, for a period of time from 3–60 minutes until a vinyl chloride content of less than 50 p.p.m. is achieved.

4,017,446

FRICTIONALLY STABLE EMULSIONS

Pat F. Rion, Borger, Tex., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Continuation-in-part of Ser. No. 276,372, July 31, 1972, abandoned, which is a continuation-in-part of Ser. No. 113,617, Feb. 8, 1971, abandoned. This application Feb. 10, 1975, Ser. No. 548,581

Int. Cl.² C08L *9/00*

U.S. Cl. 260—29.7 GP **16 Claims**

1. A frictionally stable oil-in-water emulsion having a water phase and an oil phase wherein said oil phase consists of an aromatic oil having an aromatic content of at least 50 percent and a viscosity below 50 SUS at 210° F and an elastomer dissolved therein.

4,017,447

FLOW CONTROL AGENT FOR ULTRA THIN EPOXY RESIN POWDER COATINGS

Donald Wayne Larsen, Marriottsville, and Jerrold Bain Billmyer, Sykesville, both of Md., assignors to W. R. Grace & Co., New York, N.Y.

Filed Sept. 8, 1975, Ser. No. 611,019

Int. Cl.² C08K *5/10*

U.S. Cl. 260—31.2 R **2 Claims**

1. A particulate thermosetting resin composition consisting essentially of a solid epoxy resin comprising a polyether derivative of a polyhydric organic compound containing epoxy groups and having a molecular weight in the range 1,000–4,000, 1–15% by weight of the epoxy resin of a curing agent therefor and 0.5–3.0% by weight of the composition of a flow control agent consisting essentially of liquid poly(ethylacrylate) having a number average molecular weight in the range 5,000–15,000, the particles of said composition having an average size diameter of 2–20 microns and said molecular weights herein being measured by gel permeation chromotography.

4,017,448

TRANSPARENT PIGMENT DISPERSION PROCESS

Sol Panush, Farmington Hills, Mich., assignor to Celanese Coatings & Specialties Company, Louisville, Ky.

Filed June 16, 1975, Ser. No. 587,192

Int. Cl.² C08K *5/02, 5/05, 5/07, 5/10*

U.S. Cl. 260—31.4 R **9 Claims**

1. A process for preparing a transparent pigment dispersion which comprises

A. in a first stage, dispersing a pigment selected from at least one member of the group consisting of iron oxide, phthalocyanine green, phthalocyanine blue, anthrapyrimidine yellow, flavanthrone yellow, imidazole orange, quinacridone red, carbozole blue, dioxazine blue, indanthrene blue, azo browns, isoindolinones and high molecular weight azo pigments in an acrylic resin solution, wherein the acrylic resin is a film-forming acrylic copolymer made by polymerizing acrylic monomers with a free radical producing catalyst, in a pigment to resin ratio of about 2.5:1 to about 3.5:1 and at a solids content of about 55 to about 65 weight percent using as solvents aromatic hydrocarbons and oxygenated solvents having boiling points above 240° F., under high speed, high shear, high impact conditions so that the temperature rises from room temperature to 200° to 240° F. over a period of at least 3 hours, the shear stress increases from about 300 to 600 gm./cm.sec.² to about 5,000 to 6,000 gm./cm.sec.², the flow of the dispersion changes from turbulent to laminar flow as measured by a Reynolds Number change of about 25,000 to about 30,000 down to about 1,500 to about 2,500; and

B. in a second stage at a pigment to resin ratio of about 0.5 to about 1 at a solids content of about 50 to about 65 weight percent, completing the dispersion of pigment to a fineness of 8 as measured on a Hegman scale under conditions of maximized shear and minimized impact for a period of about 12 to about 25 hours at a temperature of about 90° to about 140° F.

4,017,449

MIXTURE FOR THE MANUFACTURE OF ANTISTATIC FLOOR COVERINGS AND COATINGS

Thaddeus Audykowski, and Kurt Amsler, both of Basel, Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Continuation of Ser. No. 473,548, May 28, 1974, abandoned. This application Feb. 9, 1976, Ser. No. 656,686

Claims priority, application Switzerland, June 15, 1973, 8724/73

Int. Cl.² C08K *5/01;* **C08L** *63/00;* **H01B** *1/02*

U.S. Cl. 260—33.6 EP **10 Claims**

1. A mixture for the manufacture of antistatic floor coverings or coatings which comprises, based on the total mixture, 30 to 45% by weight of a cold-curing liquid epoxy resin combination; 45 to 70% by weight of aluminum grit the particles of which have a length of 0.35 to 1.2 mm; 0 to 30% by weight of a pigment; and 0.3 to 1.1% by weight of a thixotropic agent.

4,017,450

INHIBITION OF POLY(ARYLENE SULFIDE) RESIN INDUCED METAL CORROSION

Fay W. Bailey, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Mar. 29, 1976, Ser. No. 671,191

Int. Cl.² C08L *81/04*

U.S. Cl. 260—37 R **17 Claims**

1. A method for improving a poly(arylene sulfide) resin composition so that it will be less likely to cause metal to corrode as a result of having been in contact with molten poly(arylene sulfide) resin in said composition, said method comprising forming an intimate mixture of said poly(arylene sulfide) resin and an amount of at least one hydroxide or carbonate of an alkali metal sufficient to reduce the corrosive

nature of said poly(arylene sulfide) resin prior to placing said metal in contact with a molten state of said poly(arylene sulfide) resin.

4,017,451

PENCIL LEAD AND MANUFACTURING METHOD OF THE SAME

Nobuhiro Ishida, Yokohama, and Kazuyuki Saito, Kofu, both of Japan, assignors to Mitsubishi Chemical Industries Ltd., Tokyo and Oriental Sangyo Co., Ltd., Yamanashi, both of, Japan

Filed June 16, 1975, Ser. No. 587,327
Claims priority, application Japan, June 17, 1974, 49-68085
Int. Cl.² C08K *3/04*
U.S. Cl. 260—38 7 Claims

1. A pencil lead comprising an extrudate of a kneaded blend of a coloring material and a novolak resin or a novolak epoxy resin.

4,017,452

POLYMER MODIFIED HYDROPHILIC INORGANIC FILLERS FOR THERMOPLASTIC POLYMERIC MATERIALS

Eckhard C. A. Schwarz, Neenah, Wis., assignor to Presto Products, Incorporated, Appleton, Wis.

Filed Apr. 30, 1975, Ser. No. 573,217
Int. Cl.² B05D *7/00*; B32B *5/16*, *27/02*
U.S. Cl. 260—42.14 15 Claims

1. A method for preparing an inorganic filler which is dispersible in a thermoplastic polymeric resin comprising the steps of

admixing particles of an inorganic filler having a hydrophilic surface with an aqueous wetting angle of less than 50° with a block copolymer having an A-B-A structure with the A units being a homopolymer of ethylene oxide, the B unit being a homopolymer of propylene oxide, and a mole ratio of ethylene oxide to propylene oxide within the range of 40:60 to 90:10 and having an average molecular weight of at least 3,000, the amount of said filler being within the range of about 5 to about 95 weight %, based on the total weight of said admixture;

compounding said admixture under shear at a temperature of at least 80° C for a time period sufficient to coat said filler particles with said copolymer;

cooling the resulting compound until solidified; and

comminuting said solidified compound.

4,017,453

HOMOGENEOUS POLYEPOXIDE-POLYANHYDRIDE COMPOSITIONS

William J. Heilman, Allison Park, Pa.; Frank C. Peterson, Orange, Tex.; Mical C. Renz, and Leslie P. Theard, both of Houston, Tex., assignors to Gulf Oil Corporation, Pittsburgh, Pa.

Continuation-in-part of Ser. No. 501,634, Aug. 29, 1974, abandoned. This application June 26, 1975, Ser. No. 590,460
Int. Cl.² C08K *7/14*; C08L *63/00*, *63/02*
U.S. Cl. 260—42.18 16 Claims

1. A method of forming a handleable, thermosettable composition which comprises

forming a homogeneous liquid resin mixture substantially free of active hydrogen comprising

a. about five to about 80 weight percent based on the total resin components of an olefinically unsaturated monomer selected from styrene, ring substituted chloro-, bromo or lower alkylstyrenes, lower alkylacrylates, lower alkylmethacrylates, vinyl acetate, acrylonitrile, vinyl chloride, vinyl bromide and vinylidene chloride;

b. an anhydride component consisting of

1. an olefinically unsaturated monoanhydride selected from maleic anhydride, chloromaleic anhydride, methylmaleic anhydride, ethylmaleic anhydride, dichloromaleic anhydride, dimethylmaleic anhydride, n-butylmaleic anhydride, phenylmaleic anhydride, diphenylmaleic anhydride, chloromethylmaleic anhydride, bromophenylmaleic anhydride and itaconic anhydride, the molar ratio of the olefinically unsaturated monomer (a) to the olefinically unsaturated monoanhydride being from about 0.5:1 to about 8:1;

2. a saturated polyanhydride comprising the copolymer having between two and about 500 repeating units and prepared from one to 10 mols of said unsaturated monoanhydride (1) per mol of said olefinically unsaturated monomer (a) or prepared from equimolar amounts of said unsaturated monoanhydride (1) and one or more two to 20 carbon 1-alkenes or halogen-substituted 1-alkenes; and

3. a saturated monoanhydride selected from phthalic anhydride, hexahydrophthalic anhydride, methyltetrahydrophthalic anhydride, dodecenylsuccinic anhydride, chlorendic anhydride, and a mixture of methyl bicyclo (2.2.1)-heptane-2,3-dicarboxylic anhydride isomers;

4. the ratio of the anhydride equivalents of said olefinically unsaturated monoanhydride (1) to the sum of the total anhydride equivalents in the resin solution being from about 0.2:1 to about 1:1 and the ratio of anhydride equivalents in said saturated polyanhydride (2) to the anhydride equivalents in said saturated monoanhydride (3) being at least about 1:1;

c. an epoxy component substantially free of active hydrogen consisting of

1. an epoxy resin having a 1,2-epoxy equivalent value greater than one which is soluble in the resin solution or is capable of forming a homogeneous dispersion in the resin solution and

2. a monoepoxy compound,

3. the ratio of epoxy equivalents in the epoxy resin to the epoxy equivalents in the monoepoxy compound being at least 1:1 and an A/E ratio of total anhydride equivalents to total epoxy equivalents in the resin solution of about 0.1:1 to about 2.5:1; and

d. from about 0.01 to about 10 weight percent of an anhydride accelerator which is substantially inactive during the copolymerization reaction of said olefinically unsaturated monomer (a) and said anhydride component (b); and copolymerizing said olefinically unsaturated monomer (a) and said anhydride component (b) by free radical means at a temperature up to about 150° C. without substantial reaction of the anhydride groups with the epoxide groups present in the resin mixture whereby a handleable, thermosettable composition comprising a homogeneous mixture of polyanhydride molecules, polyepoxide molecules and anhydride accelerator is obtained.

4,017,454

GLASS CERAMIC AS FILLER IN POLYMERIZABLE DENTAL FILLING COMPOSITIONS

Gerd Müller, Mainz-Weisenau, Germany, assignor to Jenaer Glaswerk Schott & Gen., Mainz, Germany

Division of Ser. No. 505,146, Sept. 11, 1974, Pat. No. 3,973,972. This application Feb. 6, 1976, Ser. No. 655,963
Claims priority, application Germany, Sept. 21, 1973, 2347591
Int. Cl.² C08K *3/34*
U.S. Cl. 260—42.52 15 Claims

1. In a dental filling composition consisting essentially of organic compound polymerizable into a synthetic resin and particles of a glass ceramic, the improvement comprising employing as said glass ceramic particulate colorless, transparent glass ceramic having a particle size of 5–100 microns, having about 30–70% crystallinity by weight, a thermal expansion of less than $20 \cdot 10^{-7}$ degree^{-1} (0° – 50° C.) and exhibiting absorption for X-rays, said glass ceramic consisting essentially of, in percent by weight based on oxides:

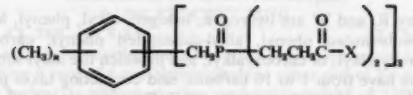
SiO_2	40 – 55
Al_2O_3	15 – 25
P_2O_5	3 – 10
Li_2O	3 – 5
MgO	0 – 3
ZnO	0 – 5
ZrO_2	2 – 7
Ta_2O_5	0 – 7
La_2O_3	10 – 20.

4,017,455
POLYOLEFINS AND POLYESTERS FLAME-PROOFED WITH CARBOXYALKYL AND CARBAMOYLALKYL SUBSTITUTED POLY(PHOSPHINE OXIDES)

Joseph Adrian Hoffman, Somerville, N.J., assignor to American Cyanamid Company, Stamford, Conn.

Filed Aug. 11, 1975, Ser. No. 603,464
Int. Cl.² C08K *1/00*
U.S. Cl. 260—45.7 P **13 Claims**

1. A flame-retarded composition comprising (1) a polyolefin selected from the group consisting of polyethylene and polypropylene or a linear, aromatic polyester selected from the group consisting of polyethylene terephthalate, polybutylene terephthalate and poly (1,4-cyclohexanedimethylene) terephthalate and (2) a flame-retarding amount of a compound having the formula



wherein X is OH or NH_2 and *n* is a whole, positive integer of 1–4, inclusive.

4,017,456
COATING COMPOSITIONS COMPRISING STABILIZED REACTION PRODUCT OF HYDROXYL-TERMINATED URETHANE AND MELAMINE RESIN

Robert Jerome Tucker, Hackettstown, and Ruth Greenwood, Somerville, both of N.J., assignors to American Cyanamid Company, Stamford, Conn.

Filed Mar. 20, 1975, Ser. No. 560,417
Int. Cl.² C08K *5/13, 5/34;* **C08L** *61/28*
U.S. Cl. 260—45.8 R **6 Claims**

1. A coating composition consisting essentially of a mixture of (1), (2), (3) and (4), in which

1. is a saturated urethane prepolymer having terminal hydroxy groups which is the reaction product of materials consisting essentially of a mixture of (a) and (b), at a molar ratio of 1:2, respectively, in which
   a. is an isocyanate-terminated urethane which is the reaction product of a mixture of (I) and (II), at a molar ratio of 1:2, respectively, in which
      I. is a saturated diol having a molecular weight of from about 200 to about 3000 and
      II. is a saturated organic diisocyanate and
   b. is a monomeric, sterically bulky, polyhydric alcohol containing 2-6 hydroxyl groups and being free of oxyalkylene units,
2. is a polyalkyl ether of a polymethylol melamine,
3. is an acid catalyst and
4. is an ultraviolet light absorber comprising 2-[(2-hydroxy-5-t-octylphenol)] benzotriazole or 2,2'-dihydroxy-4-methoxybenzophenone.

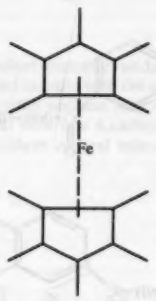
4,017,457
FLAME RETARDANT POLYCARBONATE COMPOSITIONS

Arthur L. Baron, and Parameswar Sivaramakrishnan, both of New Martinsville, W. Va., assignors to Mobay Chemical Corporation, Pittsburgh, Pa.

Filed Oct. 6, 1975, Ser. No. 620,488
Int. Cl.² C08K *5/56*
U.S. Cl. 260—45.75 P **9 Claims**

1. A polycarbonate having improved flame retardant characteristics comprising:

a polycarbonate resin and an amount effective to provide flame retardant characteristics of a member selected from the group consisting of ferrocene and ferrocene derivatives, said polycarbonate resin produced by reacting compounds selected from the group consisting of di-(monohydroxyaryl)-alkanes, dihydroxybenzenes and substituted dihydroxybenzenes with compounds selected from the group consisting of carbonic acid diesters, phosgene, bis-chlorocarbonic acid esters of di-(monohydroxyaryl)-alkanes, bis-chlorocarbonic acid esters of dihydroxybenzenes and bis-chlorocarbonic acid esters of substituted dihydroxybenzenes and said ferrocene derivatives characterized in that they do not degrade the polycarbonate resin and in that they contain a structure represented by the formula:

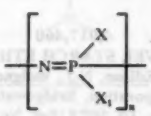


4,017,458
STABILIZATION OF POLY(PHOSPHAZENES)

Delmar Frederick Lohr, Jr., Akron, Ohio, assignor to The Firestone Tire & Rubber Company, Akron, Ohio

Filed Feb. 26, 1976, Ser. No. 661,688
Int. Cl.² C08K *5/47*
U.S. Cl. 260—45.75 W **8 Claims**

1. A poly(phosphazene) composition stabilized against thermal aging comprising a poly(phosphazene) represented by the general formula:



wherein *n* represents an integer from 3 up to about 50,000 and X and X_1 each represent a monovalent substituent selected from the groups consisting of alkoxy, substituted alkoxy, aryloxy, substituted aryloxy, hydroxy and amino, and X and X_1 are randomly distributed along the —P=N— backbone and the poly(phosphazene) includes one or two or more randomly distributed groups

and an organometallic compound compatible with said poly(phosphazene) and present in an amount sufficient to stabilize said poly(phosphazene) against thermal degra-

dation, said organometallic compound being zinc 2-mercaptobenzothiazole.

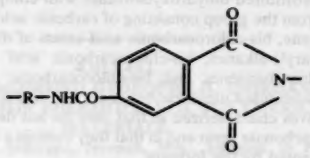
4,017,459

POLYAMIDE-IMIDES

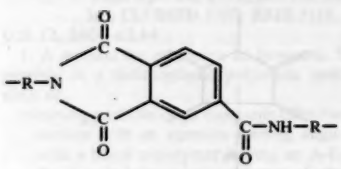
Besir K. Onder, North Haven, Conn., assignor to The Upjohn Company, Kalamazoo, Mich.

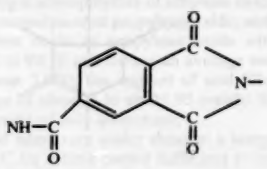
Filed Sept. 19, 1975, Ser. No. 614,838
Int. Cl.² C08G 73/14
U.S. Cl. 260—47 CP 5 Claims

1. A polyamide-imide characterized by the presence in random arrangement of at least two recurring units having the formulae:

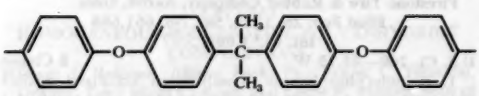


and





wherein R in each case represents



4,017,460

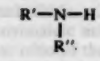
NOVEL STARCH ETHERS

Martin M. Tessler, Edison, N.J., assignor to National Starch and Chemical Corporation, Bridgewater, N.J.

Filed Dec. 10, 1975, Ser. No. 639,490
Int. Cl.² C08B 31/08
U.S. Cl. 536—50 6 Claims

1. A method for the preparation of modified starch products comprising the steps of:

a. reacting starch base with 1 to 100% by weight of the starch base of modifying agent in an aqueous medium at a pH of 9.5 to 12.5 and a temperature of 10° to 90° C. for a period of 0.2 to 24 hours, said modifying agent comprising the reaction product of a 2,3-dihalopropionic acid or a C_1–C_8 alkyl ester thereof with a secondary amine of the formula:



where R′ and R″ are, independently, alkyl, alkenyl or hydroxy or ether substituted alkyl or alkenyl wherein the total number of carbon atoms in R′ and R″ combined in a maximum of 8; and

b. isolating the resulting starch product.

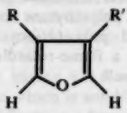
4,017,461

METHOD FOR MANUFACTURING LIQUID RESINOUS FURAN-FORMALDEHYDE CONDENSATION PRODUCTS

Andrew P. Dunlop, Riverside, and Rudy F. Macander, Cary, both of Ill., assignors to The Quaker Oats Company, Chicago, Ill.

Filed Jan. 2, 1976, Ser. No. 646,193
Int. Cl.² C08G 16/00, 2/08
U.S. Cl. 260—67 R 31 Claims

1. A method for producing a liquid resin comprising: contacting formaldehyde and a furan of the formula:



where R, and R′ are hydrogen, halogen, alkyl, phenyl, halogen-substituted phenyl, alkyl-substituted phenyl, carboxy, hydroxy-alkyl, or carboxyalkyl, and in which the alkyl substituents have from 1 to 10 carbons, said contacting takes place in the presence of a catalytically effective amount of acid catalyst for a period of time sufficient to produce a liquid resinous material, said furan being present during said contacting in a quantity sufficient to provide more than 1.1 mole of said furan per mole of formaldehyde.

4,017,462

TREATMENT OF ORGANIC TEXTILES WITH ADDUCT POLYMERS AND PHENOLS

Donald J. Daigle, New Orleans; Armand B. Pepperman, Jr., Metairie, and Sidney L. Vail, River Ridge, all of La., assignors to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.

Division of Ser. No. 499,806, Aug. 22, 1974, Pat. No. 3,961,110. This application Mar. 4, 1976, Ser. No. 663,886
Int. Cl.² C08G 12/04; C09D 5/18; C09K 3/28
U.S. Cl. 260—72 R 2 Claims

1. A process for preparing a water soluble adduct polymer comprising:

a. reacting a hydroxymethylphosphorus compound selected from the group consisting of trihydroxymethylphosphene, tetrakis(hydroxymethyl)phosphonium hydroxide and tetrakis(hydroxymethyl)phosphonium chloride with a nitrogenous compound selected from the group consisting of ammonia, hexamethylenetetraamine and ethylenediamine to form an insoluble polymeric precipitate, and

b. dissolving the precipitate from (a) in the presence of formaldehyde and a hydroxymethylphosphonium compound selected from the group consisting of tetrakis(hydroxymethyl)phosphonium acetate, tetrakis(hydroxymethyl)phosphonium oxalate, and tetrakis(hydroxymethyl)-phosphonium chloride with a mole ratio of 1:4 to 4:1 of formaldehyde to phosphorus contained in the precipitate and a 1:10 to 2:1 ratio of phosphonium compound to phosphorus contained in the precipitate.

4,017,463

HIGH MELTING N,N-TEREPHTHALOYL BIS-PHTHALIMIDE AND ITS USE AS AN ESTER INTERLINKING AGENT FOR POLYESTERS

Yuzi Okuzumi, Cuyahoga Falls, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio

Continuation of Ser. No. 465,215, April 29, 1974. This application July 21, 1975, Ser. No. 597,795

Int. Cl.² C08G 63/46, 63/68

U.S. Cl. 260—75 T 6 Claims

1. In a process for preparing high molecular weight linear polyesters of an aromatic dicarboxylic acid selected from the group consisting of terephthalic acid, isophthalic acid, 2,6-naphthoic acid, 2,7-naphthlic acid and p,p′-diphenyl dicarboxylic acid and copolyesters of at least one of said acids and a second acid by melt polymerizing the reaction product of the esterification or transesterification of the dicarboxylic acid or lower alkyl ester thereof with a glycol of the series $HO(CH_2)_nOH$ where n is an integer ranging from 2 to 10 the improvement which comprises adding to the polymerizing product, when the intrinsic viscosity of said polymerizing product is at least 0.2, from 1.0 to 20.0 parts by weight of N,N′-terephthaloyl bis-phthalimide, having a melting point of at least 330° C., per 100 parts by weight of the dicarboxylic acid or lower alkyl ester thereof and reacting it with said polymerizing product to form a high molecular weight product.

4,017,464

POLYTETRAMETHYLENE ETHER URETHANE CURED WITH 2,2′-DIAMINODIPHENYL DISULPHIDE

Michael E. Kimball, Norton, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Feb. 5, 1976, Ser. No. 655,325

Int. Cl.² C08G 18/10

U.S. Cl. 260—77.5 AM 2 Claims

1. A polytetramethylene ether polyol urethane prepared by reacting a mol of a polytetramethylene ether polyol having 2 to 3 hydroxyls and an average molecular weight of 1000 to 4000 with 1.6 to 4 mols of toluene diisocyanate containing at least 50 percent by weight of the 2,4 isomer at a temperature from ambient to 40° C. to form a prepolymer and curing said prepolymer at a temperature no higher than 150° C. with 0.8 to 0.95 mol percent of 2,2′-dithiodianiline.

4,017,465

PROCESS FOR POLYMERIZATION OF 2-PYRROLIDONE

Robert Bacskai, Kensington, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Filed Jan. 23, 1975, Ser. No. 543,384

Int. Cl.² C08G 69/24, 69/20

U.S. Cl. 260—78 P 9 Claims

1. The process for polymerizing 2-pyrrolidone comprising agitating 2-pyrrolidone, alkaline polymerization catalyst, polymerization initiator, an inert nonsolvent in weight ratio to 2-pyrrolidone of about 0.5–20:1, and an insoluble salt, which is alkali metal halide in weight ratio to 2-pyrrolidone of about 1–10:1 at a temperature of from 25° to about 70° C for 4 to about 100 hours to form a particulate poly-2-pyrrolidone product.

4,017,466

POLYBENZIMIDA ZOQUINAZOLINES AND PREPOLYMERS FOR MAKING SAME

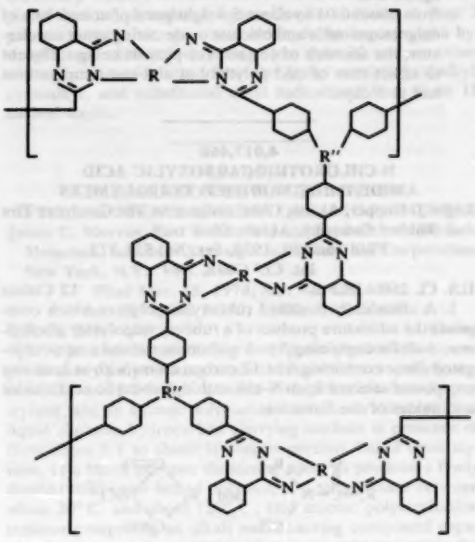
Robert J. Milligan, San Diego, Calif.; Walter P. Fitzgerald, Jr., deceased, late of San Diego, Calif., and by Mary E. Fitzgerald, surviving spouse, assignors to Whittaker Corporation, Los Angeles, Calif.

Filed Feb. 7, 1975, Ser. No. 547,890

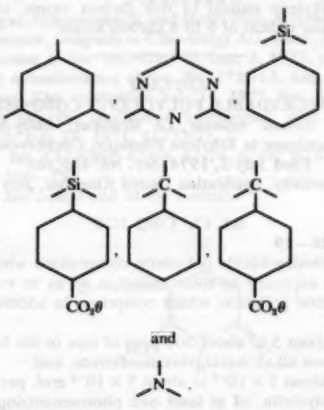
Int. Cl.² C08G 73/00, 73/18

U.S. Cl. 260—78 TF 30 Claims

1. A highly cross-linked polybenzimidazoquinazoline for laminating and molding use consisting of the following recurring unit:



wherein R is a tetravalent aromatic residue to which the nitrogen atoms are attached in pairs with the members of each pair being located in the ortho position with respect to each other and which contains at least one 6-carbon aromatic ring, and wherein R″ is a trivalent radical selected from the group consisting of



and

4,017,467

SULFUR-CURABLE COMPOSITIONS

Richard C. Doss, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Apr. 21, 1975, Ser. No. 569,908

Int. Cl.² C08F 28/00

U.S. Cl. 260—79 10 Claims

1. A polythiol composition which is curable at ambient temperatures comprising, in weight ratio:

a. 100 parts by weight of a poly(oxyalkylene)-polyester-poly(monosulfide)-polythiol having on average more than two pendent thiol groups per molecule,

b. from about 0.01 to 5 weight parts of sulfur as the curing agent, and

c. from about 0.01 to about 5 weight parts of at least one of magnesium oxide and calcium oxide curing agent accelerator, the amounts of (b) and (c) present being sufficient to effect cure of said polythiol at ambient temperatures and at 3 days.

4,017,468

N-CHLOROTHIOCARBOXYLIC ACID AMIDE/IMIDE-MODIFIED TERPOLYMERS

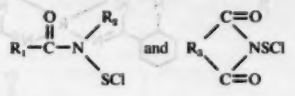
Roger J. Hopper, Akron, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed June 30, 1975, Ser. No. 591,372

Int. Cl.² C08K *5/44*

U.S. Cl. 260—79.5 B **12 Claims**

1. A chemically modified rubbery terpolymer which comprises the admixture product of a rubbery terpolymer of ethylene, α-olefin containing 3 to 6 carbon atoms and a non-conjugated diene containing 6 to 12 carbon atoms with at least one compound selected from N-chlorothio-carboxylic acid amides and imides of the formulae:



where R_1 and R_2 are radicals which can be individually selected from alkyl, cycloalkyl, benzyl, and phenyl radicals, where R_1 can additionally be selected from hydrogen, where the aromatic rings of said phenyl and benzyl radicals may be substituted with one or two radicals selected from alkyl and chloro radicals, where R_1 and R_2 may be taken together to represent an alkylene radical of 3 to 5 carbon atoms and where R_3 may be an alkylene radical of 2–4 carbon atoms, a 1,2-cycloalkylene radical of 6–8 carbon atoms, or an orthophenylene radical of 6 to 8 carbon atoms.

4,017,469

PHOTODEGRADABLE POLYOLEFIN COMPOSITIONS

Geneviéve Nicoud espouse Le Brasseur, Bully-les-Mines, France, assignor to Ethylene Plastique, Courbevoie, France

Filed July 2, 1974, Ser. No. 485,103

Claims priority, application United Kingdom, July 9, 1973, 32589/73

Int. Cl.² C08J *3/20*

U.S. Cl. 526—19 **9 Claims**

1. A photodegradable polyolefin composition which is degraded on exposure to solar radiation so as to counteract environmental pollution, which comprises, in addition to the polyolefin,

i. from about 5 to about 500 ppm of iron in the form of at least one alkali metal trioxalatoferrate, and

ii. from about 5×10^{-5} to about 5×10^{-3} mol, per 100 g of the polyolefin, of at least one photosensitizing organic compound having a triplet energy of at least about 30 Kcal/mol.

4,017,470

METHOD FOR PREPARING A HEAT-STABLE PLASMA PROTEIN SOLUTION FROM PASTE IV-1

Ken-ichi Izaka, Hirakata, and Kazuo Takechi, Sakai, both of Japan, assignors to The Green Cross Corporation, Osaka, Japan

Filed June 12, 1974, Ser. No. 478,884

Claims priority, application Japan, Feb. 18, 1974, 49-19247

Int. Cl.² C07G *7/00*

U.S. Cl. 260—112 B **6 Claims**

1. A method for preparing a heat-stable plasma protein solution showing no blood pressure-depressing action which comprises adding distilled water to a paste IV-1, a fraction obtained from the Cohn's cold ethanol plasma fractionation method, to extract water-soluble proteins in the paste and removing solids contained in the mixture by centrifuging to obtain an extract containing water-soluble proteins, heat treating the resulting extract at pH 4.5 to 5.5 at 50° to 65° C. with an organic acid having 4 to 8 carbon atoms to a final concentration of the organic acid of 2 to 6 W/V%, removing as precipitates by filtration or centrifugation lipo- and glycoproteins contained in the extract, adding 2-ethoxy-6,9-diaminoacridine lactate in an amount of 0.2 to 3.0 g. per liter of the supernatant to the resulting supernatant, allowing the mixture to stand at room temperature or below and removing by precipitation residual lipo-proteins giving turbidity to the supernatant, and then removing blood pressure-depressing substances present in the resulting supernatant by adsorption with an inorganic adsorbent or cation exchanger.

4,017,471

IMMUNOLOGICAL COMPOUNDS

David Allen Lewis Davies, High Wycombe, England, assignor to G. D. Searle & Co., High Wycombe, England

Filed Sept. 15, 1975, Ser. No. 613,446

Int. Cl.² A23J *1/06*

U.S. Cl. 260—112 B **4 Claims**

1. An antitumor agent comprising p-di(2-chloroethyl-)amino-L-phenylalanine or N,N-bis(2-chloroethyl)p-phenylenediamine hydrochloride as a cytotoxic agent bound to a tumor specific antibody by peptide bonds.

4,017,472

PROCESS FOR ISOLATION OF ASPARTYL DIPEPTIDE ESTERS

Walter G. Farkas, Ruvigliana, Ti, Switzerland; Willard M. Hoehn, Cupertino, Calif., and Joseph F. Zawadzki, Skokie, Ill., assignors to G. D. Searle & Co., Chicago, Ill.

Continuation-in-part of Ser. No. 337,927, March 5, 1973, abandoned. This application July 5, 1974, Ser. No. 485,972

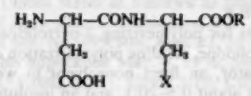
Claims priority, application Canada, Feb. 25, 1974, 193344

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 23, 1976

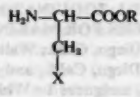
Int. Cl.² C07C *103/52;* **A23L** *1/22*

U.S. Cl. 260—112.5 R **9 Claims**

1. In a process for preparing a dipeptide ester of the general formula



wherein X is a phenyl or p-hydroxyphenyl radical, R is an alkyl radical containing 1 to 7 carbon atoms and the stereochemical configuration is L-L; by the reaction of an L-aspartic acid anhydride salt with a compound of the formula



wherein R and X are defined as above, the step of isolating said dipeptide ester from the crude reaction mixture containing said ester which comprises partitioning said crude mixture between water and a suitable alkanol containing up to 5 carbon atoms and isolating the dipeptide ester from the alkanol layer.

4,017,473
HARDENING OF PROTEINACEOUS MATERIALS

Arthur Henri De Cat, Mortsel; Valere Frans Danckaert, Bocehout; Francis Jeanne Sels, Kontich, and Robert Joseph Pollet, Vremde, all of Belgium, assignors to AGFA-GEVAERT N.V., Mortsel, Belgium

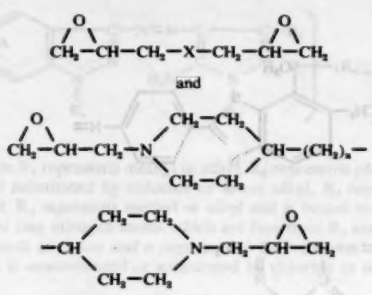
Filed May 20, 1975, Ser. No. 579,251

Claims priority, application United Kingdom, May 24, 1974, 23409/74

Int. Cl.² C09H *11/00*

U.S. Cl. 260—117 **3 Claims**

1. A process for hardening a thin layer of proteinaceous material, which comprises incorporating in the proteinaceous material at least one bis-epoxy compound corresponding to one of the formulae:



and

wherein:

X represents a 1,4-piperazinylene group or a monomethyl- or dimethyl-substituted 1,4-piperazinylene group, or represents a 1,2-pyrazolidinylene group,

and *n* is 0 or an integer from 1 to 4.

4,017,474
POLYURETHANE INTERMEDIATES AND PRODUCTS AND METHODS OF PRODUCING SAME FROM LIGNIN

Wolfgang Gerhard Glasser, and Oscar Hsien-Hsiang Hsu, both of Blacksburg, Va., assignors to Research Corporation, New York, N.Y.

Filed Aug. 15, 1975, Ser. No. 605,200

Int. Cl.² C07G *1/00*

U.S. Cl. 260—124 A **10 Claims**

1. A method for the preparation of a polycarboxyoxyalkylene polyester-ether polyol from lignin comprised of the following steps:

a. reacting lignin with maleic anhydride, substituted maleic anhydrides, or mixtures thereof to form a lignin-maleic anhydride copolymer; and

b. reacting said copolymer with an oxyalkylating medium to form the desired polycarboxy-oxyalkylene polyester-ether polyol.

4,017,475
LIGNIN COMPOSITION AND A PROCESS FOR ITS PREPARATION

Charles H. Ludwig, Bellingham, Wash., assignor to Georgia-Pacific Corporation, Portland, Oreg.

Continuation-in-part of Ser. No. 542,562, Jan. 20, 1975, abandoned. This application Sept. 22, 1975, Ser. No. 615,345

Int. Cl.² C07G *1/00*

U.S. Cl. 260—124 A **22 Claims**

1. A process for the preparation of aminoalkylated hydroxyphenylated lignosulfonate which comprises reacting a lignosulfonate with a phenol until the phenolic hydroxyl content of the hydroxyphenylated lignosulfonate is at least 2½ weight percent, the reacting the hydroxyphenylated lignosulfonate with an aldehyde and a nitrogen compound selected from a group consisting essentially of ammonia, primary amines, secondary amines, and mixtures thereof, until the aminoalkylated hydroxyphenylated lignosulfonate contains at least 3 percent organic nitrogen, said aldehyde having no alpha hydrogen, and said amines having from 1 to 22 carbon atoms with substituents selected from the group consisting of alkyl, cycloalkyl, and substituted alkyl radicals of from 1 to 18 carbon atoms.

4,017,476
PREPARATION OF FINELY DIVIDED STYRENE-DIVINYLBENZENE ORGANIC PIGMENTS

James G. Murray, East Brunswick, and Frederick C. Schwab, Metuchen, both of N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Filed Mar. 15, 1974, Ser. No. 451,405

Int. Cl.² C09B *31/30, 43/00, 1/16, 11/06*

U.S. Cl. 260—144 **14 Claims**

1. A process for producing an organic pigment that comprises slurry polymerizing a reaction mixture comprising styrene, 0.5 to 15.0 weight percent divinylbenzene based upon styrene, and an anionic polymerization initiator dispersed in a liquid aliphatic hydrocarbon slurrying medium in presence of from about 0.1 to about 10 weight percent, based upon styrene, of a block polymer dispersing agent to produce a finely divided solid cross-linked polymer, at a temperature between about 20° C. and about 120° C., said anionic polymerization initiator comprising an alkali metal-bearing compound capable of initiating polymerization of styrene, and terminating the slurry polymerization, with an organic dye, an organic dye precursor selected from the group consisting of 4,4′(bis-dimethylamino)benzophenone and 4,4′(bis-diethylamino)benzophenone, or a coupling agent and a dye.

4,017,477
3-HALOGENO-6-HYDROXY-PYRIDONE-(2) AZO DYESTUFFS

Gert Hegar, Schoenenbuch, and Henri Riat, Arlesheim, both of Switzerland, assignors to Ciba-Geigy AG, Basel, Switzerland

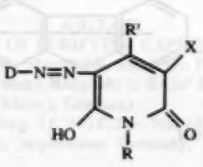
Continuation of Ser. No. 421,370, Dec. 3, 1973, abandoned, which is a continuation of Ser. No. 172,913, Aug. 18, 1971, abandoned. This application July 14, 1975, Ser. No. 595,816

Claims priority, application Switzerland, Aug. 19, 1970, 12370/70; July 28, 1971, 11173/71

Int. Cl.² C09B *62/08, 62/24, 62/50, 45/04*

U.S. Cl. 260—153 **11 Claims**

1. An azo compound of the formula:



in which

X represents chloro, bromo or fluoro,

R and R′ independently represent hydrogen, phenyl, methoxyphenyl, cyclohexyl, alkyl contains 1 to 4 carbon atoms, or alkyl containing 1 to 4 carbon atoms substituted by halo, hydroxyl, NH_2-, dimethylamino, phenyl, methoxy, acetylamino, cyano, nitro, or a fiber reactive group capable of reacting with the hydroxyl groups of cellulose or with the amino groups of polyamides

and

D represents benzene, naphthalene, phenylazobenzene, naphthylazobenzene, diphenyl, diphenylurea or stilbene which is unsubstituted or substituted by sulfo, carboxy, chloro, bromo, trifluoromethyl, cyano, carbomethoxy, carboethoxy, methylsulfonyl, β-hydroxyethylsulfonyl,

methyl, nitro, β-chloroethylsulfonyl, cyclohexyloxycarbonyl, aminosulfonyl, N-methylaminosulfonyl, N,N-dimethylaminosulfonyl, N,N-dimethylaminosulfonyl, N,γ-isopropoxypropylaminosulfonyl, benzoylamino, N-isopropylaminosulfonyl, aminosulfonyloxy, methoxy, N,N-bis-(β-hydroxyethyl)aminosulfonyl, vinylsulfo, β-sulfatoethylsulfo, β-thiosulfatoethylsulfo, β-thiosulfatopropionylamido, ethylsulfonyl, β-thiosulfatoethylsulfonylamido, β-hydroxyethylsulfonylpropionylaminoethyl, chloroacetylaminomethyl, dimethylaminosulfonoxy, di-n-butylaminosulfonoxy, n-propylaminosulfonoxy, N-morpholinosulfonoxy, N-piperidinosulfonoxy, cyclohexylaminosulfonoxy, N-methylanilinosulfonoxy, diethylaminosulfonoxy, ethyleneiminosulfonoxy, n-propoxysulfonyl, β-chloroethoxysulfonyl, benzyloxysulfonyl, ethoxysulfonyl, acetylamino, hydroxy, acetyl, carbamyl, NH_2—, or amino substituted by a fiber reactive group capable of reacting with the hydroxyl groups of cellulose or with the amino groups of polyamides or a quaternary ammonium group selected from the group p-(N-chloro, N,N,N,-trimethylaminoacetyl) phenoxy, 2-(N-chloropyridinium(1)) ethoxy, N-chloro, N,N-dimethyl hydrazinium(N)-acetyl, N-bromo, N,N,N-triethylaminoacetyl, 3-(N-chloropyridinium(1))-2-hydroxypropylaminosulfonyl, and N-chloro, N-methylpyridinium (3)carbonamido; or 1:1 or 1:2 complexes thereof with iron, manganese, nickel, copper cobalt or chromium.

4,017,478

WATER-SOLUBLE AZO DYES HAVING A 2-ACETOACETAMIDOFLUORENYL COUPLING COMPONENT RADICAL

Jacky Dore, Basel, Switzerland, assignor to Sandoz Ltd., Basel, Switzerland

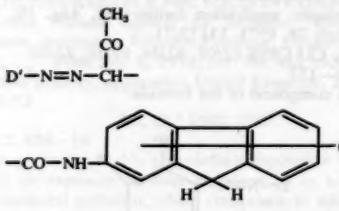
Division of Ser. No. 40,355, May 25, 1970, abandoned. This application Sept. 6, 1974, Ser. No. 503,967

Claims priority, application Switzerland, June 2, 1969, 8335/69; June 20, 1969, 9463/69

Int. Cl.² C09B *29/32, 31/10, 35/20, 45/28*

U.S. Cl. 260—158 **13 Claims**

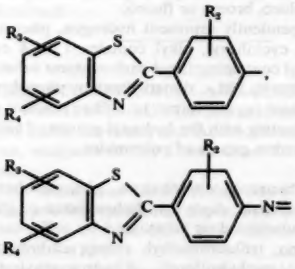
1. A compound of the formula



or a mixture thereof,

wherein

D′ is



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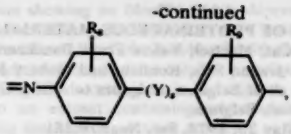
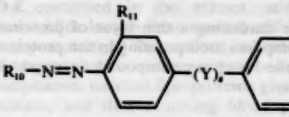
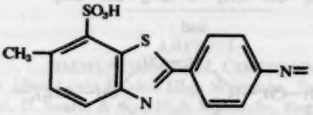
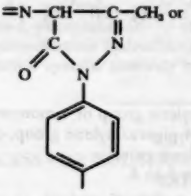
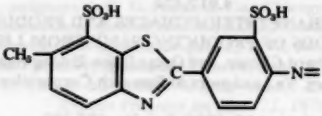
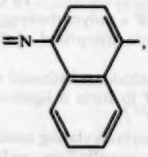












wherein

R_2 is hydrogen or sulfo,

R_3 is hydrogen, lower alkyl or sulfo,

R_4 is hydrogen, lower alkyl or sulfo,

R_8 is hydrogen, lower alkyl, lower alkoxy, carboxy or sulfo,

R_9 is hydrogen, lower alkyl, lower alkoxy, carboxy or sulfo, with the proviso that when R_8 and R_9 are sulfo or carboxy they are in the 2,2′- or 3,3′-positions,

R_{10} is 1-phenyl-3-methylpyrazol-5-one-4-yl or 1-(3′-sulfophenyl)-3-methylpyrazol-5-one-4-yl,

R_{11} is hydroxy, carboxy or lower alkoxy,

R_{12} is hydroxy, carboxy or lower alkoxy,

Y is —CH=CH—, —NH—CO—, —CO—NH— or —NH—CO—NH—,

s is 0 or 1, and

t is 0, 1 or 2, with the proviso that the molecule contains 1 to 5 sulfo groups.

4,017,479
CATIONIC INDAZOLE-AZO-5-AMINO PYRAZOLE DYESTUFFS

Günther Kaupp, Binningen, and Jacques Voltz, Riehen, both of Switzerland, assignors to Ciba-Geigy AG, Switzerland

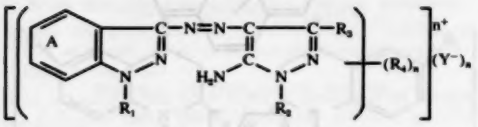
Continuation of Ser. No. 78,287, Oct. 5, 1970, abandoned, which is a continuation-in-part of Ser. No. 747,385, July 26, 1968, abandoned. This application Mar. 14, 1973, Ser. No. 341,098

Claims priority, application Switzerland, Aug. 11, 1967, 11355/67

Int. Cl.² C09B *29/38, 45/12;* **D06P** *3/70*

U.S. Cl. 260—158 **13 Claims**

1. A dye salt of the formula



wherein R_1 represents methyl or ethyl, R_2 represents phenyl or phenyl substituted by chlorine or lower alkyl, R_3 represents methyl, R_4 represents methyl or ethyl and is bound to one of the two ring nitrogen atoms which are free from R_1 and R_2, Y represents an anion and *n* represents 1 or 2 and the benzene ring A is unsubstituted or substituted by chlorine or nitro.

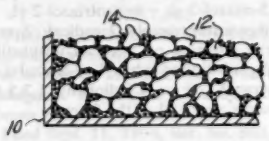
4,017,480
HIGH DENSITY COMPOSITE STRUCTURE OF HARD METALLIC MATERIAL IN A MATRIX

Charles S. Baum, St. Clair Shores, Mich., assignor to Permanence Corporation, Detroit, Mich.

Filed Aug. 20, 1974, Ser. No. 498,994

Int. Cl.² C22C *29/00*

U.S. Cl. 428—601 **4 Claims**



1. A wear resistant plate comprising: a substantially uniform dispersion of a plurality of irregularly shaped particles of a relatively large average size produced by crushing sintered tungsten carbide and a plurality of irregularly shaped particles of sintered tungsten carbide of a substantially smaller average size disposed within and substantially filling the interstices of the larger particles, said particles being bonded within a matrix of a metal having a lower melting point than said particles.

4,017,481
RIFAMYCIN COMPOUNDS

Leonardo Marsili, Segrate, (Milan); Vittorio Rossetti, Melzo, (Milan), and Carmine Pasqualucci, Milan, all of Italy, assignors to Archifar Industrie Chimiche del Trentino S.p.A., Rovereto, Italy

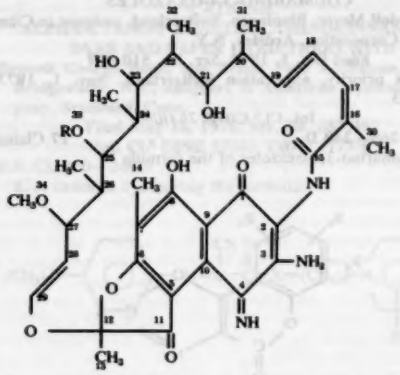
Filed Apr. 27, 1976, Ser. No. 680,771

Claims priority, application Italy, May 15, 1975, 5155/75

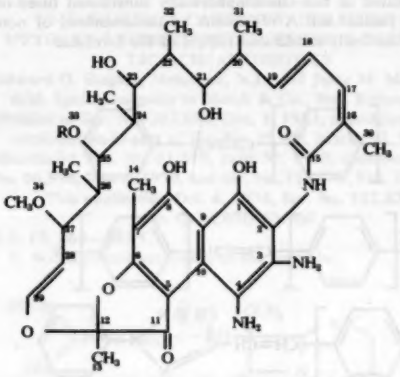
Int. Cl.² C07D *498/08*

U.S. Cl. 260—239.3 P **5 Claims**

1. A Rifamycin compound selected from the group consisting of a compound having the following formula:


(I)

in which R is —H or —$COCH_3$, its 16, 17, 18, 19 tetrahydroderivatives, 16, 17, 18, 19, 28, 29 hexahydroderivatives and corresponding reduced products having the formula:


(III)

wherein R is —H or —$COCH_3$, its 16, 17, 18, 19 tetrahydroderivatives, 16, 17, 18, 19, 28, 29 hexahydroderivatives.

4,017,482
METHOD OF PURIFYING CAPROLACTAM

Rudolph Hans Gath, Mannheim, and Hugo Fuchs, Ludwigshafen, both of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen (Rhine), Germany

Filed Aug. 11, 1975, Ser. No. 603,444

Claims priority, application Germany, Sept. 11, 1974, 2443341

Int. Cl.² C07D *201/16*

U.S. Cl. 260—239.3 A **5 Claims**

1. A method for purifying crude caprolactam obtained in the Beckmann rearrangement of cyclohexanone oxime in oleum together with impure caprolactam obtained from the gas-phase rearrangement of cyclohexanone oxime in the presence of a catalyst, which process comprises adding the impure lactam obtained from the catalytic gas-phase rearrangement of cyclohexanone oxime to an acid rearrangement mixture derived from the Beckmann rearrangement of cyclohexanone oxime in oleum in an amount of said impure lactam up to 50% of the lactam in said acid rearrangement mixture, maintaining the resultant mixture of said lactams at a temperature of 100° to 200° C with thorough stirring of said mixture, then neutralizing said mixture, and recovering substantially pure caprolactam from the neutralized mixture.

4,017,483

COUMARINO-3,4-OXAZOLES

Hans Rudolf Meyer, Binningen, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

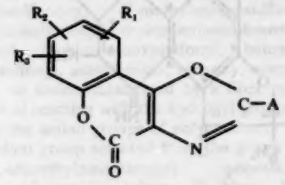
Filed Oct. 1, 1974, Ser. No. 510,979

Claims priority, application Switzerland, Nov. 1, 1973, 15405/73

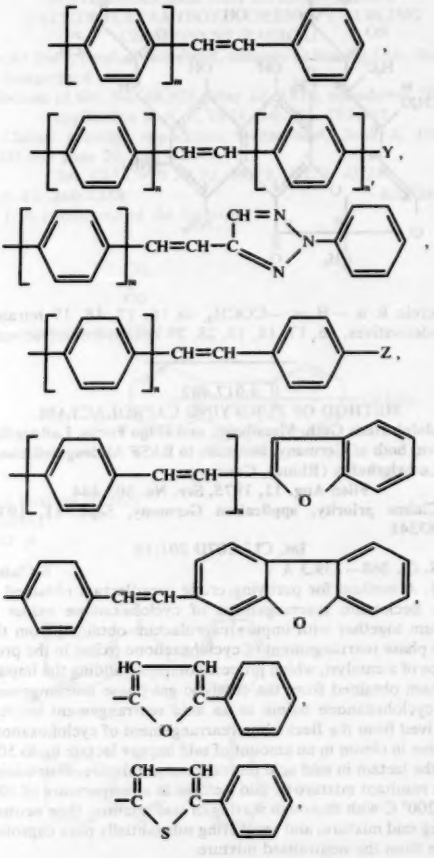
Int. Cl.² C07D 263/00

U.S. Cl. 260—240 D 17 Claims

1. Coumarino-3,4-oxazoles of the formula



wherein R_1, R_2 and R_3 independently of one another represent hydrogen or a non-chromophoric substituent or R_1 and R_2 in the o-position relative to one another together represent an unsubstituted or non-chromophorically substituted fused-on benzene radical and A represents an unsubstituted or non-chromophorically substituted radical of the formulae



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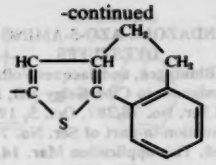
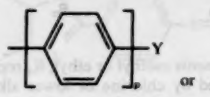
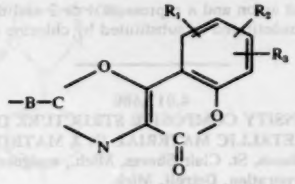
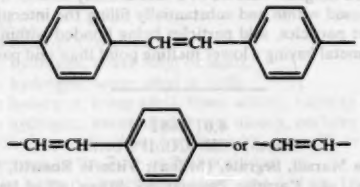






wherein Y represents an optionally non-chromophorically substituted benzoxazol-2-yl, naphthoxazol-2-yl, phenanthreno-9′,19′:4,5-oxazol-2-yl, benzotriazol-2-yl, naphthotriazol-2-yl or phenanthrotriazolyl-2 radical. Z represents a radical having the meaning of Y or an unsubstituted non-chromophorically substituted phenyl, 2-triazolyl, 5-phenyloxdiazol-2-yl, pyrazol-1-yl or 4,6-diphenyl-1,3,5-triazin-2-yl radical, B represents a radical of the formula



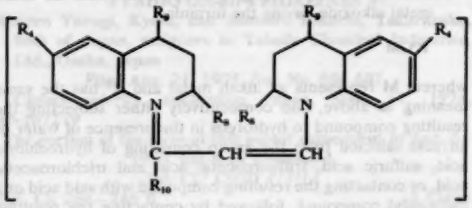
or a 1,4-phenylene, 4,4′-diphenylene, 1,4-naphthylene, 2,6-naphthylene, 2,5-furylene or 2,5-thienylene radical, or a dibenzofurane, dibenzothiophene-dioxide or 9,10-dihydrophenanthrylene-2,7 radical bonded in the 3,7-position to the oxazole radical, *m* represents the numbers 0, 1 or 2, *n* and *n′* represent the number 0 or 1 and *p* represents the number 1 or 2 and the sum of *n*+*n′* must be 1 or 2.

4,017,484
CATIONIC DYESTUFFS

Alfred Brack, and Hubertus Psaar, both of Leverkusen, Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Continuation of Ser. No. 469,521, May 13, 1974, abandoned, which is a continuation of Ser. No. 271,723, July 14, 1972, abandoned. This application Oct. 23, 1975, Ser. No. 625,181
Claims priority, application Germany, July 14, 1971, 2135156
Int. Cl.² C07D *401/06*
U.S. Cl. 260—240 R 6 Claims

1. Cationic dyestuff having the formula



wherein

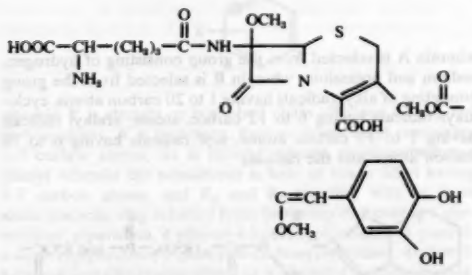
R_4 denotes an alkoxy group with 1 to 4 C atoms;
R_8 denotes hydrogen or a methyl group;
R_9 denotes hydrogen or a methyl group;
R_{10} denotes hydrogen, a phenyl radical or a phenyl radical substituted by chloro, methyl, methoxy nitro or ethoxycarbonylamino; and
An^- denotes an anion.

4,017,485
7-METHOXYCEPHALOSPORIN DERIVATIVES

Tōru Hasegawa, Kawanishi; Kazunori Hatano; Hiroshi Fukase, both of Osaka, and Hidesuke Iwasaki, Itami, all of Japan, assignors to Takeda Chemical Industries, Ltd., Osaka, Japan

Filed Sept. 11, 1974, Ser. No. 505,089
Claims priority, application Japan, Sept. 18, 1973, 48-105287
Int. Cl.² C07D *501/20*
U.S. Cl. 260—240 J 1 Claim

1. A compound selected from the group consisting of a compound of the formula:



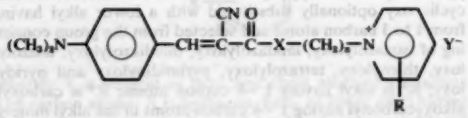
and pharmaceutically acceptable salts thereon.

4,017,486
CATIONIC ALPHA-CYANO-P-DIMETHYLAMINOCINNAMOYL DYES AND PAPER DYED THEREWITH

Bennett George Buell, and Frank Fred Loffelman, both of Bridgewater, N.J., assignors to American Cyanamid Company, Stamford, Conn.

Filed May 18, 1976, Ser. No. 687,492
Int. Cl.² C09B *57/00*; C07D *211/00*
U.S. Cl. 260—240.9 5 Claims

1. A cationic dye having the formula:



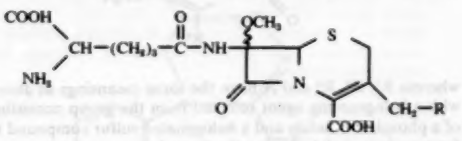
wherein R is selected from hydrogen and methyl, X is selected from O and NH, *n* is 2 or 3 and Y^- is an anion selected from halide and methosulfate.

4,017,487
7β-(D-5-AMINO-5-CARBOXYVALERAMIDO)-7-METHOXY-3-SUBSTITUTED-3-CEPHEM-4-CARBOXYLIC ACID ANTIBIOTICS

Edward O. Stapley, Metuchen, N.J., and Justo M. Mata, Madrid, Spain, assignors to Merck & Co., Inc., Rahway, N.J.

Division of Ser. No. 203,896, Dec. 1, 1973, abandoned, and a continuation-in-part of Ser. No. 19,496, March 13, 1970, abandoned, Ser. No. 51,319, June 30, 1970, abandoned, Ser. No. 96,594, Dec. 9, 1970, and Ser. No. 115,779, Feb. 16, 1971. This application Oct. 4, 1974, Ser. No. 512,837
Int. Cl.² C07D *501/60*
U.S. Cl. 260—243 C 2 Claims

1. A compound according to the formula:



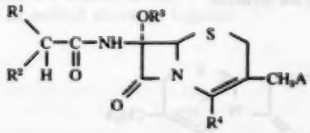
wherein R is hydroxy.

4,017,488
PROCESS FOR PREPARING 7β-ACYLAMINO-7α-ALKOXYCEPHALOSPORINS

Tetsuo Hiraoka, and Yukio Sugimura, both of Tokyo, Japan, assignors to Sankyo Company Limited, Tokyo, Japan

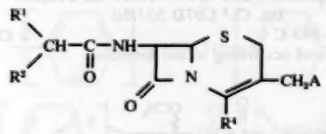
Filed July 29, 1975, Ser. No. 600,083
Claims priority, application Japan, Aug. 22, 1974, 49-96495
Int. Cl.² C07D *501/02*
U.S. Cl. 260—243 C 7 Claims

1. A process for preparing a cephalosporin derivative having the formula

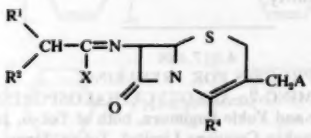


Wherein R^1 represents hydrogen, alkyl having 1 – 4 carbon atoms, phenyl or naphthyl; R^2 is hydrogen, alkyl having 1 – 4

carbon atoms, phenyl or napthyl, alkylthio having 1 – 4 carbon atoms, alkynylthio having 2 – 4 carbon atoms, phenylthio, azidoalkylthio having 1 – 4 carbon atoms, cyanoalkylthio having 1 – 4 carbon atoms in the alkyl moiety, alkylsulfonyl having 1 – 4 carbon atoms, 5- or 6-membered heterocyclic optionally substituted with a lower alkyl having from 1 to 3 carbons and selected from the group consisting of thienyl, imidazolyl, thiadiazolyl, isoxazolyl, tetrazolyl, pyrimidinyl and pyridyl, 5- or 6-membered heterocyclic thio optionally substituted with a lower alkyl having from 1 to 3 carbons and selected from the group consisting of imidazolylthio, thiadiazolylthio, triazolythio, thienylthio, isoxazolylthio, tetrazolythio, pyrimidinylthio and pyridylthio, or 5-or 6-membered heterocyclic oxy optionally substituted with a lower alkyl having from 1 to 3 carbon atoms and selected from the group consisting of isoxazolyloxy, imidazolyloxy, thiadiazolyloxy, triazolyloxy, thienyloxy, tetrazolyloxy, pyrimidinyloxy and pyridyloxy; R^3 is alkyl having 1 –4 carbon atoms; R^4 is carboxyl, alkoxycarbonyl having 1 – 4 carbon atoms in the alkyl moiety, chloroalkoxycarbonyl having 1 – 4 carbon atoms in the alkyl moiety, benzyloxycarbonyl optionally substituted with methoxy or nitro, diphenylmethyloxycarbonyl, trialkylsilyloxycarbonyl having 1 – 4 carbon atoms in each alkyl moiety, dialkylhalogenosilyloxycarbonyl having 1 – 4 carbon atoms in each alkyl moiety wherein halogen is chloro or bromo, phenacyloxycarbonyl optionally substituted with halogen or methoxy, acetoxycarbonyl, benzoyloxycarbonyl, chloroacetoxycarbonyl, bromoacetoxycarbonyl, dichlorophosphinooxycarbonyl, dibromophosphinooxycarbonyl, dimethylphosphinooxycarbonyl or an aminocarbonyl; A is hydrogen, azido or the formula —B—E wherein B is oxygen or sulfur and E is acetyl, propionyl or benzoyl, alkyl having 1 – 4 carbon atoms or optionally substituted - carbamoyl, - thiocarbamoyl or - heterocyclic group which comprises contacting a 7β-acylaminocephalosporin having the formula:

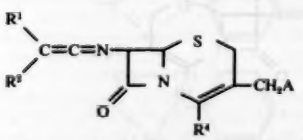


wherein R^1, R^2, R^4 and A have the same meansings as above with a halogenating agent selected from the group consisting of a phosphorus halide and a halogenated sulfur compound to form an iminohalide having the formula:

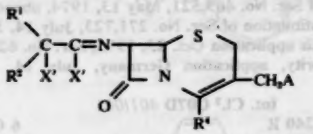


wherein X represents a halogen atom and R^1, R^2, R^4 and A have the same meanings as above,

contacting the said iminohalide with a base selected from the group consisting of an alkali metal carbonate, alkali metal hydroxide, an organic tertiary amine, diazabicycloctane and diazabicyclononene, to form a keteneimine having the formula:



Wherein R^1, R^2, R^4 and A have the same meanings as above, contacting the said keteneimine with a halogen selected from the group consisting of chlorine, bromine and iodine, to form a halogeno-iminohalide having the formula:



wherein R^1, R^2, R^4 and A have the same meanings as above and X′ represents a halogen atom,

contacting the said halogeno-iminohalide with an alkali metal alkoxide having the formula:

R^3OM

wherein M represents an alkali metal and R^3 has the same meaning as above, and consecutively either subjecting the resulting compound to hydrolysis in the presence of water or an acid selected from the group consisting of hydrochloric acid, sulfuric acid, trifluoroacetic acid and trichloroacetic acid, or contacting the resulting compound with said acid or a chlorosilyl compound, followed by contacting the resulting compound with water.

4,017,489

PROCESS OF PREPARING UNSYMMETRICAL DISULFIDES

John P. Lawrence, Stow, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed July 10, 1975, Ser. No. 594,831

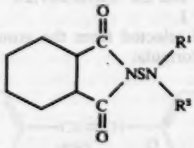
Int. Cl.[2] **C07C** *154/02, 155/10, 161/00;* **C07D** *277/72*

U.S. Cl. 260—243 B **2 Claims**

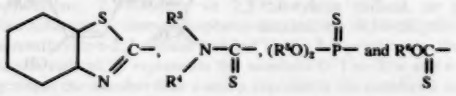
1. A process of preparing a compound having the structure

comprising reacting a thiol compound having the structure RSA

with an N-(aminothio)-imide having the structure



wherein A is selected from the group consisting of hydrogen, sodium and potassium, wherein R is selected from the group consisting of alkyl radicals having 1 to 20 carbon atoms, cycloalkyl radicals having 6 to 12 carbon atoms, aralkyl radicals having 7 to 11 carbon atoms, aryl radicals having 6 to 10 carbon atoms and the radicals



wherein R^1, R^2, R^3, R^4, R^5 and R^6 are selected from the group consisting of the alkyl, cycloalkyl and aralkyl radicals described for R and wherein R^5 can also be an aryl radical having 6 to 10 carbon atoms and wherein R^1 and R^2 and/or R^3 and R^4 can also be joined to form, with the attached nitrogen, a heterocyclic ring containing 5 to 7 carbon atoms which can contain, but need not contain, one other hetero atom selected from the group consisting of —O—, —S— and —N—.

4,017,490
PYRIDO (3,4-d)PYRIDAZINES

Shojiro Yurugi, Kyoto, and Shintaro Kikuchi, Takarazuka, both of Japan, assignors to Takeda Chemical Industries, Ltd., Osaka, Japan

Filed Aug. 21, 1975, Ser. No. 606,607
Claims priority, application Japan, Sept. 17, 1974, 49-107279
The portion of the term of this patent subsequent to Apr. 6, 1993, has been disclaimed.
Int. Cl.² C07D *413/14*
U.S. Cl. 260—246 B **1 Claim**

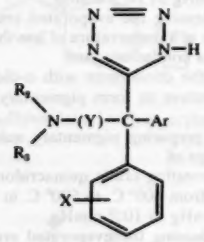
1. 8-methoxy-1,4-dimorpholino-7-phenylpyrido[3,4-d]-pyridazine or a pharmaceutically acceptable salt thereof.

4,017,491
1,1-DIARYL-1H-TETRAZOLE AMINES

Gilbert W. Adelstein, Evanston, Ill., assignor to G. D. Searle & Co., Chicago, Ill.

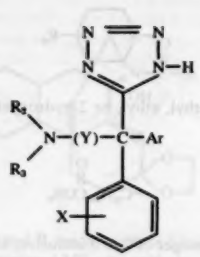
Continuation-in-part of Ser. No. 456,755, April 1, 1974, Pat. No. 3,917,615, and Ser. No. 568,694, April 16, 1975. This application July 28, 1975, Ser. No. 599,413
Int. Cl.² C07D *401/06, 403/08*
U.S. Cl. 260—247.5 E **16 Claims**

1. A compound of the formula



wherein Y is straight or branched chain alkylene having 1–4 carbon atoms; X is hydrogen, halo or lower alkyl containing 1–7 carbon atoms; Ar is pyridyl, phenyl, mono-substituted phenyl wherein the substituent is halo or lower alkyl having 1–7 carbon atoms; and R_2 and R_3 together with N is an azamonocyclic ring selected from the group comprising 1-pyrrolidinyl, piperidino, 4-phenyl-4-hydroxypiperidino, 4-phenyl-4-acetoxypiperidino, 4-phenyl-4-carboxypiperidino, 4-phenyl-4-carboloweralkoxypiperidino, or 4-phenyl-4-hydroxymethylpiperidino and morpholino.

2. A compound of the formula



wherein Y is straight or branched chain alkylene containing 1–4 carbon atoms; X is hydrogen, halo, or lower alkyl having 1–7 carbon atoms; Ar is pyridyl, phenyl, monosubstituted phenyl wherein the substituent is halo or lower alkyl having 1–7 carbon atoms; and R_2 and R_3 together with N is an azabicycloalkanyl containing 6 to 9 carbon atoms and having at least 5 atoms in each ring of the azabicycloalkanyl.

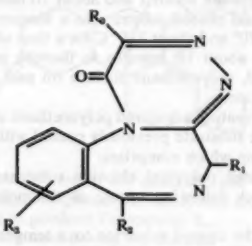
16. A compound according to claim 1 which is 5-[1-phenyl-1-(3-pyridyl)-3-(morpholino]propyl-1H-tetrazole.

4,017,492
AS-TRIAZINOBENZODIAZEPIN-1-ONES

Robert B. Moffett, Kalamazoo, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

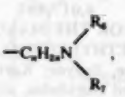
Filed Apr. 2, 1976, Ser. No. 672,995
Int. Cl.² C07D *253/08*
U.S. Cl. 260—248 AS **12 Claims**

1. An as-triazinobenzodiazepin-1-one of the formula IV

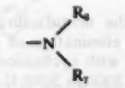


IV

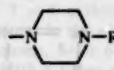
where in R_9 is hydrogen, alkyl of 1 to 3 carbon atoms, inclusive, $—C_nH_{2n}OR$, in which n is an integer of 1 to 3, inclusive, and R is hydrogen or methyl,



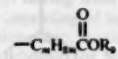
in which n is defined as before and R_6 and R_7 are hydrogen or alkyl as defined above, or together



is pyrrolidino, piperidino, morpholino, or



in which R_4 is methyl, ethyl, or 2-hydroxyethyl,



in which m is an integer of 0 to 3 inclusive, and R_5 is hydrogen, lower alkyl of from 1 to 4 carbon atoms, inclusive; wherein R_1 is hydrogen or methyl; wherein R_2 is phenyl, o-chlorophenyl, o-fluorophenyl, 2,6-difluorophenyl or 2-pyridyl; and wherein R_3 is hydrogen, chloro, fluoro, bromo, trifluoromethyl, or nitro, or the pharmacologically acceptable acid addition salts thereof.

4,017,493
TEXTURED POLYURETHANE SURFACE

George R. Ferment, Randolph, N.J., and David B. Skinner, Allentown, Pa., assignors to GAF Corporation, New York, N.Y.

Filed June 11, 1975, Ser. No. 585,796
Int. Cl.² B05D *3/02, 5/02, 7/04*
U.S. Cl. 427—257 9 Claims

1. A process for creating a textured surface with a polyurethane coating on a polyvinyl chloride substrate which comprises;

a. forming a smooth, uncured, polyurethane coating on a polyvinyl chloride substrate;

b. heating the polyurethane coated polyvinyl chloride substrate to a temperature between about 100° and 160° C for a time of between about 1 and about 10 minutes; and

c. then heating said coated substrate to a temperature between about 170° and about 210° C for a time of between about 0.5 and about 10 minutes to thereby produce a cured, textured, polyurethane surface on said polyvinyl chloride substrate.

6. A process for creating a textured polyurethane surface on a polyvinyl chloride substrate previously coated with a cured, polyurethane coating which comprises;

a. aging the coated polyvinyl chloride substrate at least about one week following curing of the polyurethane coating; and

b. then heating the coated substrate to a temperature between about 140° and about 210° C for a time of between about 0.1 and about 10 minutes to thereby texture the surface of said polyurethane coated substrate.

4,017,494
CATALYST FOR THE MANUFACTURE OF TRIETHYLENEDIAMINE

Horst Guenter Bosche, Speyer; Karl Baer, Weinheim, and Kurt Schneider, Bad Durkheim, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Germany

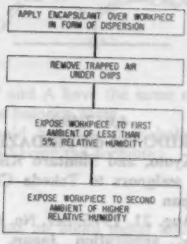
Filed Sept. 3, 1975, Ser. No. 609,953
Claims priority, application Germany, Sept. 7, 1974, 2442929
Int. Cl.² C07D *295/02*
U.S. Cl. 260—268 T 5 Claims

1. A process for the manufacture of triethylenediamine which comprises the elimination of glycol from N,N'-dihydroxyethylpiperazine, with cyclization, in the gas phase at a temperature of from 200° to 500° C and a pressure of from 0.001 to 10 bars, over a solid catalyst selected from the group consisting of α-Al_2O_3, β-Al_2O_3, γ-Al_2O_3, and ϵ-Al_2O_3.

4,017,495
ENCAPSULATION OF INTEGRATED CIRCUITS

Donald Jaffe, Emmaus, and Nicholas Alec Soos, Macungie, both of Pa., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Oct. 23, 1975, Ser. No. 625,315
Int. Cl.² B29C *6/00*
U.S. Cl. 264—272 11 Claims


APPLY ENCAPSULANT OVER WORKPIECE IN FORM OF DISPERSION
REMOVE TRAPPED AIR UNDER CHIPS
EXPOSE WORKPIECE TO FIRST AMBIENT OF LESS THAN 5% RELATIVE HUMIDITY
EXPOSE WORKPIECE TO SECOND AMBIENT OF HIGHER RELATIVE HUMIDITY

1. A method of encapsulating a circuit element formed on an insulating substrate wherein a gap exists between the element and the substrate and whereby the area under the element is filled with encapsulant comprising the steps of:

applying over and under said element an encapsulant comprising a dispersion of a material which cures by reaction with moisture;

evaporating the solvent of said dispersion by exposure to a first dry ambient with a relative humidity of less than 5%, which suppresses crosslinking and

curing the material by exposure to a second ambient with a relative humidity of at least 20%.

4,017,496
PROCESS FOR PREPARING PIGMENTARY QUINACRIDONE IN PREDETERMINED CRYSTAL FORM

Albert Robert Hanke, Scotch Plains, N.J., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Nov. 21, 1975, Ser. No. 634,170
Int. Cl.² C09B *48/00*
U.S. Cl. 260—279 QA 3 Claims

1. Process for preparing pigmentary quinacridone in the α-form by the steps of

i. vacuum evaporating crude quinacridone at an elevated temperature from 400° C. to 500° C. in a high vacuum of from 10^{-3} mmHg to 10^{-5} mmHg,

ii. rapidly condensing the evaporated crude quinacridone on a substrate at a temperature of less than 40° C. to form an amorphous condensate, and

iii. contacting the condensate with o-dichlorobenzene at room temperature to form pigmentary quinacridone in the α-form.

2. Process for preparing pigmentary quinacridone in the β-form by the steps of

i. vacuum evaporating crude quinacridone at an elevated temperature from 400° C. to 500° C. in a high vacuum of from 10^{-3} mmHg to 10^{-5} mmHg,

ii. rapidly condensing the evaporated crude quinacridone on a substrate at a temperature of less than 40° C. to form an amorphous condensate, and

iii. contacting the condensate with boiling o-dichlorobenzene to form pigmentary quinacridone in the β-form.

3. Process for preparing pigmentary quinacridone in the γ-form by the steps of

i. vacuum evaporating crude quinacridone at an elevated temperature from 400° C. to 500° C. in a high vacuum of from 10^{-3} mmHg to 10^{-5} mmHg,

ii. rapidly condensing the evaporated crude quinacridone on a substrate at a temperature of less than 40° C. to form an amorphous condensate, and

iii. contacting the condensate with dimethylformamide at room temperature to form pigmentary quinacridone in the γ-form.

4,017,497

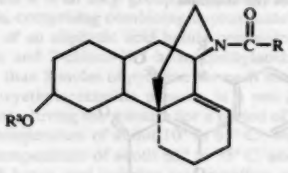
PROCESS FOR THE PREPARATION OF 14-HYDROXYMORPHINAN DERIVATIVES

Gary Lim, Candiac, and John W. Hooper, Pierrefonds, both of Canada, assignors to Bristol-Myers Company, New York, N.Y.

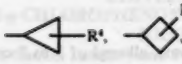
Filed Nov. 18, 1975, Ser. No. 632,947
Int. Cl.² C07D 221/28
U.S. Cl. 260—285 10 Claims

1. The process for the preparation of the compound having the formula

X



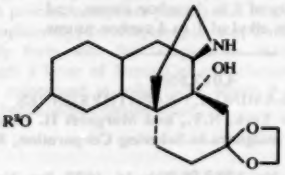
in which R^3 is (lower)alkyl and R is selected from the group consisting of



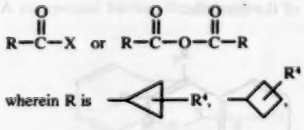
$-CF_3$ and OR^1 in which R^1 is (lower)alkyl and R^4 is H or CH_3; which process comprises the consecutive steps of

A. treating the compound having the formula

VI



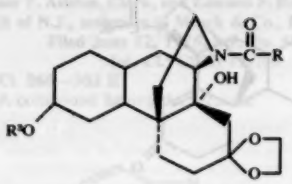
in which R^3 is (lower)alkyl with an acylating agent having the formula



wherein R is

CF_3, or $-OR^1$ in which R^1 is (lower)alkyl, R^4 is H or CH_3, and X is chloro, bromo, iodo or a mixed anhydride moiety, in a molar ratio of about 1 to 2.0 moles of acylating agent per mole of Compound VI, in the presence of a tertiary amine to produce the compound having the formula

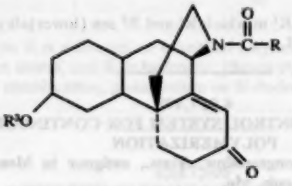
VII



in which R^3 and R are as defined above;

B. heating Compound VII with sulfuric acid in a (lower)alkanol to produce the compound having the formula

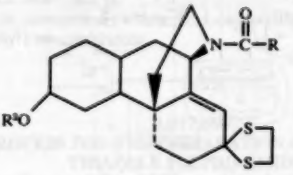
VIII



in which R^3 and R are as above;

C. treating Compound VIII with excess ethanedithiol and boron trifluoride etherate in acetic acid to produce the compound having the formula

IX

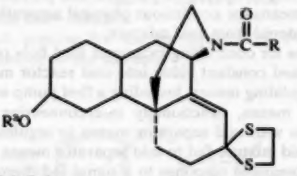


in which R^3 and R are as above; and

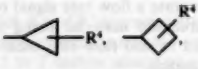
D. heating Compound IX with Raney nickel in a (lower)alkanol to produce Compound X.

4. A compound having the formula

IX

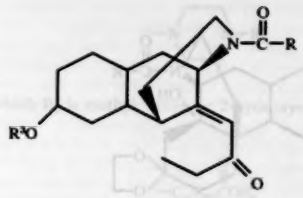


in which R is

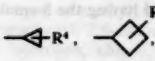


CF_3 or $-OR^1$ in which R^1 and R^3 are (lower)alkyl and R^4 is H or CH_3.

7. A compound having the formula



wherein R^3 is (lower)alkyl and R is



CF_3 or —O—R^1 in which R^1 and R^3 are (lower)alkyl and R^4 is H or CH_3.

4,017,498

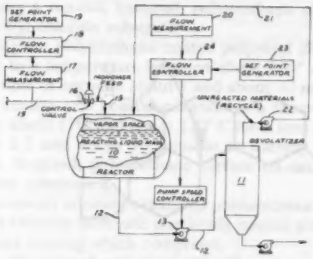
RECYCLE CONTROL SYSTEM FOR CONTINUOUS POLYMERIZATION

Byrd Hopkins, Longmeadow, Mass., assignor to Monsanto Company, St. Louis, Mo.

Division of Ser. No. 452,303, March 18, 1974, abandoned. This application Apr. 18, 1975, Ser. No. 569,349

Int. Cl.² C08F *1/98*

U.S. Cl. 23—285 **3 Claims**



1. Apparatus for controlling the material balance and the weight fraction of polymer in a reactor, said apparatus comprising in combination:

A. a variable fillage reactor means for the continuous polymerization of monomer to produce a fluid product comprising a mixture of unreacted material and polymer,

B. a separator means for continuous physical separation of unreacted material from said mixture,

C. a valve means for controlling monomer feed flow rate at a predetermined constant value into said reactor means,

D. flow rate regulating means, including a first pump means and conduit means, functionally interconnecting said reactor means with said separator means to regulate the quantity of said mixture fed to said separator means from said reactor means in response to a signal fed thereto,

E. flow rate measuring means functionally interconnected with said separator means to measure the quantity of unreacted material so separated from said mixture in said separator means and to generate a flow rate signal representative thereof, said unreacted material being taken from said separator and fed to said flow rate measuring means by a second pump means,

F. signal generating means to generate a prechosen set signal,

G. flow rate control means to compare said flow rate signal with said prechosen set signal and to generate an output signal representative of any difference between said flow rate signal and said prechosen set signal, and

H. signal interconnecting means functionally joining said signal generating means with said flow rate control means, said flow rate measuring means with said flow rate control means, and said flow rate control means with said flow rate regulating means, whereby the quantity of said mixture so fed to said separator means from said reactor means contains a predetermined quantity of unreacted material.

4,017,499

6H(1)-BENZOPYRANO(3,2-c)QUINOLINES

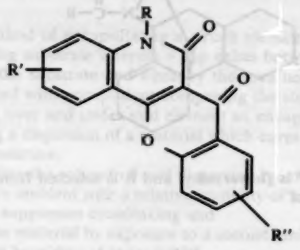
Goetz E. Hardtmann, Morristown, and Gary M. Coppola, Parsippany, both of N.J., assignors to Sandoz, Inc., E. Hanover, N.J.

Filed Apr. 5, 1976, Ser. No. 673,743

Int. Cl.² C01D *215/16*

U.S. Cl. 260—289 C **14 Claims**

1. A compound of the formula:



wherein

R is alkyl of 1 to 5 carbon atoms, alkenyl of 3 to 5 carbon atoms, alkynyl of 3 to 5 carbons, benzyl optionally mono- or disubstituted independently by fluoro, chloro or alkyl of 1 to 4 carbon atoms or cycloalkylalkyl in which the cycloalkyl is of 3 to 6 carbon atoms and the alkyl is of 1 to 3 carbon atoms, provided that the unsaturation on any alkenyl or alkynyl is other than on the alpha carbon atom,

R′ is hydrogen, alkyl of 1 to 4 carbon atoms, fluoro, chloro, bromo or alkoxy of 1 to 4 carbon atoms, and

R″ is hydrogen or alkyl of 1 to 4 carbon atoms.

4,017,500

CERTAIN 8-AMINO-1,7-NAPHTHYRIDINES

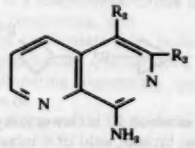
Joseph Mayer, New York, N.Y., and Margaret H. Sherlock, Bloomfield, N.J., assignors to Schering Corporation, Kenilworth, N.J.

Division of Ser. No. 379,525, July 16, 1973, Pat. No. 3,928,367, which is a continuation-in-part of Ser. No. 119,377, Feb. 26, 1971, abandoned, which is a continuation-in-part of Ser. No. 816,075, April 14, 1969, abandoned. This application Nov. 12, 1975, Ser. No. 631,010

Int. Cl.² C07D *213/74*

U.S. Cl. 260—294.8 C **13 Claims**

1. a compound of the formula:



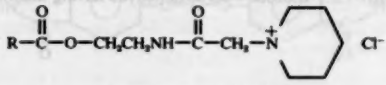
wherein R_2 is selected from the group consisting of hydrogen, lower alkyl, phenyl, benzyl, phenthyl and pyridyl and R_3 is selected from the group consisting of furyl and thienyl.

4,017,501
PROCESS FOR PREPARING PYRIDINIUM CHLORIDE SALTS OF ALKYL ESTERS OF 2-CHLORO-N-2-HYDROXYETHYLACETAMIDE

John Edson Gordon, Martinsville, and Robert A. Ralston, Lebanon, both of N.J., assignors to American Cyanamid Company, Stamford, Conn.

Filed Oct. 24, 1975, Ser. No. 625,407
Int. Cl.² C07D *213/20*
U.S. Cl. 260—295 Q 9 Claims

1. A method for producing a pyridinium salt represented by the formula:



wherein R is an alkyl group containing from 11 to 17 carbon atoms, comprising combining approximately equimolar quantities of an aliphatic acid halide containing 12 to 18 carbon atoms and 2-chloro-N-2-hydroxyethylacetamide and slightly more than 2 moles of pyridine for each mole of 2-chloro-N-2-hydroxyethylacetamide present, in a non-hydroxylic organic solvent, stirring the mixture for a period of about 1 to 4 hours at a temperature of about 10° to 65° C., warming the mixture to a temperature of about 65° to 95° C. and stirring for about 1 to 8 hours, and isolating said pyridium salt.

4,017,502
PROCESS FOR PURIFYING THE MIXED ESTER, ETHYLENE GLYCOL 1-(2-p-CHLOROPHENOXY)-2-METHYLPROPIONATE NICOTINATE

Carlos Sunkel Letelier, and Fernando CilleroGrafulla, both of Madrid, Spain, assignors to Alter, S.A., Madrid, Spain

Filed Aug. 4, 1975, Ser. No. 601,866
Claims priority, application Spain, June 4, 1975, 438246
Int. Cl.² C07D *213/55*
U.S. Cl. 260—295.5 R 1 Claim

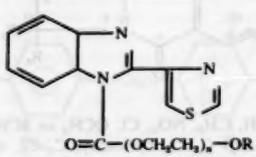
1. A process for purifying the mixed ester, ethylene glycol 1-[2-(p-chlorophenoxy)-2-methylpropionate]-2-nicotinate, which process comprises passing said ethylene glycol 1-[2-(p-chlorophenoxy)-2-methylpropionate]-2-nicotinate prepared in oily form with the temperature maintained at 60° C. through a layer of Super-Cel and charcoal, to prepare the same compound in solid form, which is then recrystallized from benzene/petroleum ether.

4,017,503
ANTIFUNGAL 1-SUBSTITUTED BENZIMIDAZOLES

Wallace T. Ashton, Clark, and Edward F. Rogers, Middletown, both of N.J., assignors to Merck & Co., Inc., Rahway, N.J.

Filed June 12, 1975, Ser. No. 586,438
Int. Cl.² C07D *417/00*
U.S. Cl. 260—302 H 7 Claims

1. A compound having the formula:



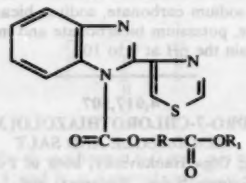
wherein *n* is a number of from 1 to 4; and R is loweralkyl or phenylloweralkyl.

4,017,504
ANTIFUNGAL 1-SUBSTITUTED BENZIMIDAZOLES

Wallace T. Ashton, Clark, and Edward F. Rogers, Middletown, both of N.J., assignors to Merck & Co., Inc., Rahway, N.J.

Filed June 12, 1975, Ser. No. 586,439
Int. Cl.² C07D *417/00*
U.S. Cl. 260—302 H 7 Claims

1. A compound having the formula:



wherein R is a straight or branched alkylene of from 3 to 10 carbon atoms, and R_1 is hydrogen, phenacyl, halophenacyl, an alkali metal cation, guanidinium or N-dodecyl guanidinium.

4,017,505
1-(N-OCTYLTHIOCARBONYL)-2-(4-THIAZOLYL)BENZIMIDAZOLE

Edward F. Rogers, Middletown; Wallace T. Ashton, Clark, and Richard A. Dybas, Edison, all of N.J., assignors to Merck & Co., Inc., Rahway, N.J.

Continuation of Ser. No. 467,190, May 6, 1974, abandoned. This application Oct. 23, 1975, Ser. No. 625,335
Int. Cl.² C07D *417/00*
U.S. Cl. 260—302 H 1 Claim

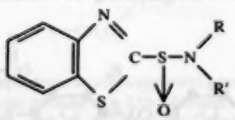
1. A compound which is 1-(n-octylthiocarbonyl)-2-(4-thiazolyl)-benzimidazole.

4,017,506
PROCESS FOR THE PREPARATION OF 2-BENZO THIAZOLE SULPHINAMIDES

Georges Raymond Henry Mingasson, Paris; Michel Louis Jules Montu, Enghien les Bains, and Michel Jean Camille Alicot, Soisy sous Montmorency, all of France, assignors to Ugine Kuhlmann, Paris, France

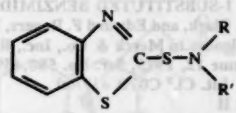
Continuation-in-part of Ser. No. 862,920, Oct. 1, 1969, abandoned. This application Jan. 27, 1975, Ser. No. 544,540
Claims priority, application France, Oct. 2, 1968, 68.168410; Apr. 30, 1969, 69.13809
Int. Cl.² C07D *277/80*
U.S. Cl. 260—306.6 R 6 Claims

1. A process for the preparation of 2-benzothiazolesulphinamides of the formula:



(I)

in which R and R′ represent alkyl groups containing from 1 to 6 carbon atoms, cyanoethyl or cycloalkyl groups containing from 5 to 7 carbon atoms or —NRR′ is piperidino, hexamethyleneimino, morpholino, or 2,6-dimethylmorpholino which comprises oxidizing with an alkali metal hypochlorite, at a temperature between −5° C and below 30° C. an aqueous suspension of a sulphenamide of the formula:



(II)

in which R and R′ have the same significance as in formula (I) in the presence of a sufficient amount of an alkaline agent selected from sodium carbonate, sodium bicarbonate, potassium carbonate, potassium bicarbonate and mixtures thereof so as to maintain the pH at 9 to 10.

4,017,507

2,3-DIHYDRO-7-CHLOROTHIAZOLO[3,2-A]BENZIMIDAZOLE AND SALT

Kalman Hideg; Olga Hankovszky, both of Pecs; Eva Palosi, Budapest; Gyorgy Hajos, Budapest, and Laszlo Szporny, Budapest, all of Hungary, assignors to Richter Gedeon Vegyeszeti Gyar Rt., Budapest, Hungary

Division of Ser. No. 473,184, May 24, 1974, Pat. No. 3,932,395. This application Dec. 5, 1975, Ser. No. 637,978
Claims priority, application Hungary, June 20, 1973, RI 509
Int. Cl.² C07D *513/04*
U.S. Cl. 260—306.7 T **1 Claim**

1. 2,3-dihydro-7-chloro-(1,3)-thiazolo [3,2-a] benzimidazole or the hydrochloric acid addition salt thereof.

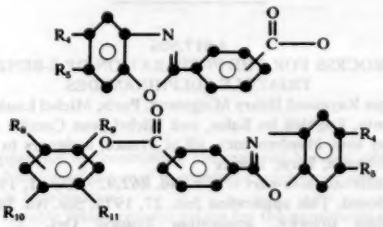
4,017,508

BENZOXAZOLE ULTRAVIOLET STABILIZERS AND THEIR USE IN ORGANIC COMPOSITIONS

David Martin Pond, Kingsport, Tenn., assignor to Eastman Kodak Company, Rochester, N.Y.

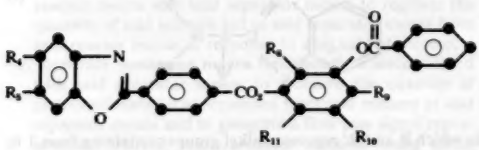
Filed July 1, 1974, Ser. No. 484,849
Int. Cl.² C07D *263/56*
U.S. Cl. 260—307 D **15 Claims**

1. A composition of matter having the formula:



wherein R_4 is hydrogen, lower alkyl, or nitrile; R_5 is hydrogen or lower alkyl; and at least one R_8, R_9, R_{10} and R_{11} is hydrogen, and the remainder are hydrogen, lower alkyl, alkoxy containing 1 to 20 carbon atoms, halogen, or nitrile or carboalkoxy containing 1 to 20 carbon atoms.

4. A composition of matter having the formula:



wherein R_4 is hydrogen, lower alkyl, or nitrile; R_5 is hydrogen or lower alkyl; and at least R_8, R_9, and R_{11} is hydrogen and the remaining R_8, R_9, R_{10} and R_{11} are hydrogen, lower alkyl, alkoxy containing 1 to 20 carbon atoms, halogen or nitrile or carboxy.

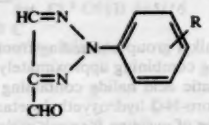
4,017,509

PROCESS FOR PRODUCING SUBSTITUTED OR UNSUBSTITUTED 2-PHENYL-1.2.3.-TRIAZOLE-4-CARBOXALDEHYDE

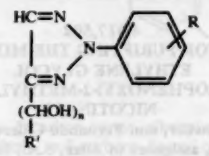
Michihiro Tsujimoto, Tachikawa; Ryoichi Tsukahara, Yokohama; Masaaki Torisu, Tokyo, and Ichiro Okubo, Hachioji, all of Japan, assignors to Mitsui Toatsu Chemicals, Incorporated, Tokyo, Japan

Filed Aug. 12, 1975, Ser. No. 604,031
Claims priority, application Japan, Sept. 2, 1974, 49-99874
Int. Cl.² C07D *249/06*
U.S. Cl. 260—308 A **10 Claims**

1. A process for producing substituted or unsubstituted 2-phenyl-1.2.3-triazole-4-carboxaldehyde having the formula:



wherein R is hydrogen, halogen, methyl, carboxyl, sulfonic acid group or alkali metal salt thereof, which comprises oxidizing 2-phenylglycosotriazole having the formula:



wherein R has the same meaning as that defined above, *n* is 2 or 3, and R′ is hydroxymethyl when *n* is 2, and is methyl or hydroxymethyl when *n* is 3, in dilute sulfuric acid with an oxide of manganese selected from the group consisting of manganese dioxide and manganese oxide.

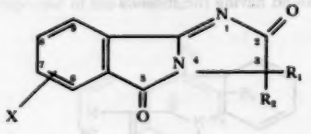
4,017,510

IMIDAZOISOINDOLEDIONES AND THE USE THEREOF AS HERBICIDAL AGENTS

Marinus Los, Pennington, N.J., assignor to American Cyanamid Company, Stamford, Conn.

Filed Nov. 12, 1975, Ser. No. 631,357
Int. Cl.² C07D *235/00*
U.S. Cl. 260—309.6 **10 Claims**

1. A compound having the structure:



I

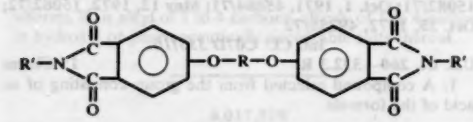
wherein X is H, CH_3, NO_2, Cl, OCH_3 or SCH_3; R_1 is alkyl C_1–C_4; R_2 is alkyl C_1–C_8, cycloalkyl C_3–C_8, alkenyl C_3–C_4, phenyl, halophenyl or benzyl; and when R_1 and R_2 are taken together with the carbon to which they are attached they may form cycloalkyl C_3–C_6 optionally substituted with methyl; and the optical isomers thereof.

4,017,511
PREPARATION OF AROMATIC BISIMIDES

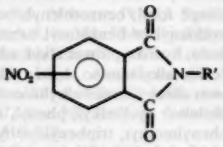
Frank J. Williams, III, Scotia, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Mar. 24, 1976, Ser. No. 670,047
Int. Cl.² C07D 209/34
U.S. Cl. 260—326 N 12 Claims

1. The process for making aromatic imides of the general formula



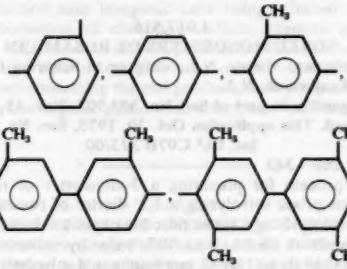
which comprises (1) effecting reaction under substantially anhydrous conditions between a nitrophthalimide of the general formula



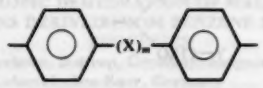
with a dihydroxy compound of the general formula

HO—R—OH

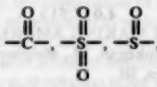
where r is a member selected from the class consisting of
a. divalent radicals of the formula



and
b. divalent organic radicals of the general formula



where X is a member selected from the class consisting of divalent radicals of the formulas $-C_yH_{2y}-$,



—O— and —S—, where *m* is 0 or 1, *y* is a whole number from 1 to 5, and R′ is a phenyl radical or an alkyl radical of from 1 to 2 carbon atoms, the said reaction being conducted in a solvent selected from the class consisting of dimethyl formamide, dimethyl acetamide, N-methylpyrrolidone, and mixtures of such solvents and in the presence of a substantially water free solid alkali-metal hydroxide, and (2) isolating the formed aromatic bisimide.

4,017,512
PROCESS FOR PRODUCING N-ALKYLHYDROXYLAMINES

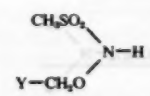
Yoshikazu Isowa, Funabashi, and Hideaki Kurita, Sagamihara, both of Japan, assignors to Sagami Chemical Research Center, Tokyo, Japan

Filed July 1, 1975, Ser. No. 592,310
Claims priority, application Japan, July 2, 1974, 49-74983; July 2, 1974, 49-74984
Int. Cl.² C07C 83/00, 83/02, 83/08; C07D 209/34
U.S. Cl. 260—326 N 6 Claims

1. A process for producing an N-alkylhydroxylamine of the formula (I)

RNH-OH (I)

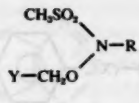
wherein R represents a straight or branched chain alkyl group having 1 to 4 carbon atoms which may be substituted with one or more substituents selected from the group consisting of a halogen atom, a phenyl group, a phthalimido group, a carboxyl group or an alkoxycarbonyl group having 1 to 4 carbon atoms in the alkoxy moiety thereof and an amino group, which comprises reacting an N-mesyl-O-(p-alkoxybenzyl)hydroxylamine or an N-mesyl-O-(2,4,6-trialkylbenzyl)hydroxylamine of the formula (IV)

 (IV)

wherein Y represents a p-alkoxyphenyl group or a 2,4,6-trialkylphenyl group, each having 1 to 4 carbon atoms in each of the alkyl moieties, with an alkyl halide of the formula (III)

R-X (III)

wherein R is as defined above and X represents a halogen atom, in the presence of a base selected from the group consisting of an alkali metal alkoxide, an alkali metal hydroxide, an alkali metal hydride and a mixture thereof and in an inert solvent to produce the corresponding N-alkyl-N-mesyl-O-(p-alkoxybenzyl)hydroxylamine or N-alkyl-N-mesyl-O-(2,4,6-trialkylbenzyl)hydroxylamine of the formula (II)



(II)

wherein Y and R are as defined above, and treating the resulting compound of the formula (II) above with a solution of hydrogen bromide in an aliphatic acid in the presence of a phenol compound.

4,017,513

METHOD FOR MAKING AMINOACID AMIDES

Robert Roteman, Waukegan, Ill., assignor to Abbott Laboratories, North Chicago, Ill.

Filed Mar. 17, 1975, Ser. No. 558,581

Int. Cl.² C07D *207/16*

U.S. Cl. 260—326.2 **5 Claims**

1. The process of making the optically pure amide of an aminoacid consisting essentially in adsorbing an optically pure loweralkyl ester of an aminoacid dissolved in an inert solvent to a cationic exchange resin in the hydrogen cycle having a pK_a of $1.7 \times 10^{-5} - 4.0 \times 10^{-1}$ and wherein said complex contains at least one equivalent of resin per equivalent of said aminoacid spearating the desired amide from said resin by bringing said resin in contact with an excess of an amine of the formula RNH_2 wherein R is hydrogen or loweralkyl, separating the insoluble residue from the reaction mixture, and isolating said amide from the liquid phase.

4,017,514

HYPOLIPIDEMIC AGENTS

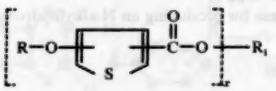
Roger Alan Parker, Cincinnati, Ohio, assignor to Richardson-Merrell Inc., Wilton, Conn.

Filed June 16, 1975, Ser. No. 587,044

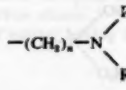
Int. Cl.² C07D *333/24*

U.S. Cl. 260—332.2 G **10 Claims**

1. A compound selected from the formula:



wherein R is selected from a straight or branched saturated hydrocarbon chain containing from 10 to 20 carbon atoms and a straight or branched unsaturated hydrocarbon chain containing from 10 to 20 carbon atoms and from 1 to 4 double bonds; R_1 is selected from hydrogen, a straight or branched lower alkyl chain of from 1 to 6 carbon atoms, benzyl, phenethyl, alkane-poly-yl containing from 3 to 6 carbon atoms and from 2 to 6 univalent bonds, 1,2,3,4,5,6-cyclohexanehexayl, and Z; Z is the group



wherein n is the integer 2 or 3; R_2 is selected from a straight or branched lower alkyl chain of from 1 to 4 carbon atoms and alkylcarbonyl wherein the alkyl moiety contains from 1 to 4 carbon atoms and may be straight or branched; R_3 is selected from hydrogen and a straight or branched lower alkyl chain of from 1 to 4 carbon atoms with the proviso that when R_3 is hydrogen, R_2 is alkylcarbonyl; X is an integer of from 1 to 6 with the proviso that when R_1 is alkane-poly-yl or 1,2,3,4,5,6-cyclohexanehexayl, X is equal to from 2 to 6, and when R_1 is other than alkane-poly-yl or 1,2,3,4,5,6-cyclohexanehexayl, X is equal to 1; and pharmaceutically acceptable salts thereof.

4,017,515

α-(ETHERIFIED OXIMINO) CARBOXYLIC ACIDS AND ACID CHLORIDES

Martin C. Cook, Liverpool; Gordon I. Gregory, Chalfont St. Peter, and Janice Bradshaw, Harow, all of England, assignors to Glaxo Laboratories Limited, Greenford, England

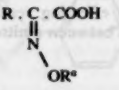
Division of Ser. No. 304,524, Nov. 7, 1972, Pat. No. 3,971,728, which is a continuation-in-part of Ser. No. 252,666, May 12, 1972, abandoned. This application Sept. 30, 1975, Ser. No. 618,167

Claims priority, application United Kingdom, May 14, 1971, 15082/71; Oct. 1, 1971, 45884/71; May 12, 1972, 15082/72; Oct. 25, 1972, 49255/72

Int. Cl.² C07D *333/16*

U.S. Cl. 260—332.3 R **15 Claims**

1. A compound selected from the group consisting of an acid of the formula



wherein R is thienyl; furyl; benzothienyl; benzofuryl; or thienyl, furyl, benzothienyl or benzofuryl substituted by fluoro, chloro, bromo, iodo, hydroxy, lower alkyl, nitro, amino, lower alkylamino, di(lower alkyl)amino, lower alkanoyl, lower alkanoylamido, lower alkoxy, lower alkylthio or carbamoyl; and R^a is lower alkyl; lower cycloalkyl; phenyl; naphthyl; benzyl; phenylethyl; diphenylmethyl; triphenylmethyl; thienylmethyl; furylmethyl; pyridylmethyl; pyrrolylmethyl; or any of these groups substituted by hydroxy, carboxy, lower alkxoycarbonyl, benzyloxycarbonyl, acetamido, benzamido, cyano, lower alkanoyl, amino, lower alkoxycarbonylamino, benzyloxycarbonylamino, fluoro, chloro, bromo, iodo or lower alkoxy, the said acid being in the form of a syn isomer free of the corresponding anti isomer to the extent of at least 75% based on the total weight of said acid; and the acid chloride thereof.

4,017,516

NOVEL MONOESTERS OF ROSAMICIN

Hans Reimann, Wayne, N.J., assignor to Schering Corporation, Kenilworth, N.J.

Continuation-in-part of Ser. No. 303,903, Nov. 15, 1972, abandoned. This application Oct. 30, 1975, Ser. No. 627,322

Int. Cl.² C07D *315/00*

U.S. Cl. 260—343 **12 Claims**

1. A process for preparing a 3-monoester of rosamicin which comprises solvolyzing a 3,2′-diester of rosamicin in a medium comprising a water miscible organic solvent containing from about 5% to about 50% water by volume, at from about 0° C to about 100° C, continuing said solvolysis for from about ¼ to about 72 hours and isolating the 3-monoester from said medium.

4,017,517

2-(TRISUBSTITUTED BENZOYL)-PROPIONIC ACID AND A METHOD FOR THE PRODUCTION THEREOF

Tadakazu Murata, Osaka; Akira Nohara, Kyoto; Hirosada Sugihara, and Yasushi Sanno, both of Osaka, all of Japan, assignors to Takeda Chemical Industries, Ltd., Osaka, Japan

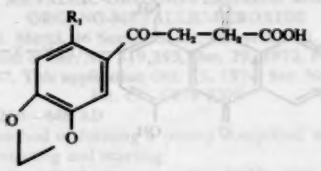
Division of Ser. No. 288,348, Sept. 12, 1972, Pat. No. 3,943,169. This application Nov. 26, 1975, Ser. No. 635,446

Claims priority, application Japan, Sept. 13, 1971, 46-71087; Sept. 13, 1971, 46-71088; Dec. 29, 1971, 47-3167; Jan. 11, 1972, 47-5401

Int. Cl.² C07D *317/44*

U.S. Cl. 260—340.5 **7 Claims**

1. A compound of the formula



wherein R_1 is alkyl of 1 to 4 carbons, alkoxy of 1 to 4 carbons or hydroxyl or pharmaceutically acceptable salts thereof.

4,017,518

METHOD OF PREPARING 4,4-DIMETHYLDIOXANE-1,3

Boris Nikolaevich Gorbunov, prospekt Lenina 6, kv. 41; Galina Dmitrievna Efremova, ulitsa Sovetskaya 26, kv. 65, both of Volgograd; Evgeny Maximovich Kukartsev, ulitsa Kommunisticheskaya 38, kv. 18; Lidia Vladimirovna Erokhina, ulitsa Druzhby 12, kv. 49, both of Volzhsky Volgogradskoi; Anatoly Ivanovich Lukashov, ulitsa Palekhskaya 9, korpus 1, kv. 65, Moscow; Vitaly Vasilievich Orlyansky, ulitsa Sovetskaya 5, kv. 21, Volzhsky Volgogradskoi oblasti; Alexandr Pavlovich Khardin, ulitsa Krasnopiterskaya 2, kv. 32, Volgograd; Ideya Antonovna Churikova, prospekt Lenina 101, kv. 65, and Daniil Iosifovich Valdman, ulitsa Sovetskaya 37, kv. 35, both of Volzhsky Volgogradskoi oblasti, all of U.S.S.R.

Continuation of Ser. No. 484,788, July 1, 1974, abandoned. This application Apr. 18, 1975, Ser. No. 569,388

Int. Cl.² C07D *319/04*

U.S. Cl. 260—340.7 **3 Claims**

1. A method of preparing 4,4-dimethyldioxane-1,3 comprising reacting isobutylene with formaldehyde in an aqueous medium at 90°–115° C in the presence of a catalyst comprising inorganic salts of mineral acids, whose aqueous solutions have a pH value of from 2.2 to 4.5 and whose acidity of said aqueous solutions does not increase with an increase in the salt concentration said inorganic salts being selected from the group consisting of chromium sulfate, chromic potassium sulfate, ferriamonium sulfate, potassium bifluoride, aluminum nitrate, and chromium trichloride, to form organic and aqueous phases containing the end product; separating said phases; washing the organic phase with water; and isolating the end product.

4,017,519

FLUORO DIOXOLANE ANESTHETIC COMPOUNDS

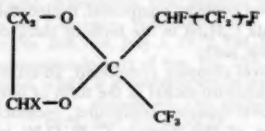
George L. Moore, South Plainfield, and Ross C. Terrell, Plainfield, both of N.J., assignors to Airco, Inc., Montvale, N.J.

Division of Ser. No. 348,407, April 5, 1973, Pat. No. 3,930,013, which is a division of Ser. No. 168,401, Aug. 2, 1971, Pat. No. 3,749,793. This application Sept. 24, 1975, Ser. No. 616,351

Int. Cl.² C07D *317/10*

U.S. Cl. 260—340.9 **3 Claims**

1. A cyclic ether compound of the formula



wherein n is zero or one, and each X is F when n is zero and is H when n is one.

4,017,520

PRODUCTION OF MALEIC ANHYDRIDE BY AZEOTROPIC DEHYDRATION OF MALEIC ACID SOLUTIONS DERIVED FROM BENZENE OXIDATION PROCESSES

Herbert Haferkorn, Bottrop, Germany, assignor to Veba-Chemie AG, Gelsenkirchen-Buer, Germany

Filed Mar. 7, 1975, Ser. No. 556,240

Claims priority, application Germany, Mar. 8, 1974, 2411101

Int. Cl.² C07D *307/60*

U.S. Cl. 260—346.8 M **2 Claims**

1. In a process for the preparation of maleic acid anhydride by the dehydration of maleic acid which maleic acid is in an aqueous solution resulting from a catalytic benzene oxidation process and which thus contains benzoquinone, and in which said aqueous maleic acid solution is fed to a distillation zone in which maleic anhydride and an organic solvent are being refluxed and in which the water of dehydration is removed by azeotropic distillation, the improvement for lessening the formation of precipitation products in said distillation zone which comprises adding to the maleic acid aqueous solution, prior to dehydration, 0.1–2.0 wt.% of phthalic acid or its anhydride, based upon the weight of maleic acid.

4,017,521

PROCESS FOR THE MANUFACTURE OF MALEIC ANHYDRIDE USING HIGH SURFACE AREA CATALYST

Ronald A. Schneider, Berkeley, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Continuation-in-part of Ser. No. 263,883, June 19, 1972, abandoned. This application May 11, 1973, Ser. No. 359,294

Int. Cl.² C07D *307/60*

U.S. Cl. 260—346.8 A **7 Claims**

1. A process for producing maleic anhydride, which comprises partially oxidizing a hydrocarbon feed selected from the group consisting of aromatic and saturated or mono- or diolefinic acyclic or cyclic hydrocarbons having a carbon atom content in the range 4 to 10 and a linear chain of at least 4 carbon atoms, at a temperature in the range from about 300° to 500° C. by contacting a mixture of said feed and air or of said feed and a molecular oxygen-containing gas with a crystalline phosphorus-vanadium mixed oxide catalyst composition containing phosphorus, vanadium and oxygen, wherein the catalyst is effective for catalyzing the oxidation of the feed to maleic anhydride and wherein the catalyst is characterized by vanadium having an average valence in the range from about plus 3.9 to 4.6, a phosphorus to vanadium atomic ratio in the range from about 0.9–1.8 to 1, and an intrinsic surface area in the range from about 10 to 50 square meters per gram.

4,017,522

N-(FUROYLOXYETHYL) FATTY ACID AMIDES

August V. Bailey; Gordon J. Boudreaux; Gene Sumrell, all of New Orleans, and Arthur F. Novak, Baton Rouge, all of La., assignors to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.

Filed Mar. 15, 1976, Ser. No. 667,063

Int. Cl.² C07D *307/68*

U.S. Cl. 260—347.5 **6 Claims**

1. N,N-bis(2-furoyloxyethyl)lauramide.

4,017,523
PROCESS FOR THE CONTINUOUS PREPARATION OF POLYGLYCIDYL ETHERS OF POLYHYDROXY PHENOLS

Silvio Vargiu, Sesto S. Giovanni (Milan); Giancarlo Crespolini, Bergamo, and Giulio Grazzini, Cinisello Balsamo (Milan), all of Italy, assignors to Societa' Italiana Resine S.I.R. S.p.A., Milan, Italy

Filed May 30, 1975, Ser. No. 582,518
Claims priority, application Italy, May 30, 1974, 23314/74
Int. Cl.² C07D 301/28
U.S. Cl. 260—348.6 8 Claims

1. A method for the continuous preparation of liquid epoxy resins comprising diglycidyl ethers of dihydroxy phenols by reacting a dihydroxy phenol with an epihalohydrin in the presence of an alkali metal hydroxide, which comprises:

contacting in a first stage of reaction a dihydroxy phenol with an excess of epihalohydrin in a quantity of from 8 to 15 moles of said epihalohydrin for each mole of said dihydroxy phenol and an aqueous solution of alkali metal hydroxide in a molar ratio of said hydroxide to said dihydroxy phenol not exceeding 2:1, at a pressure of from 1 to 4 atmospheres above atmospheric pressure, at a temperature of from 80° to 140° C and with a residence time of from 20 to 140 minutes;

subjecting the reaction products of said first stage to decantation and washing with water, at a pressure of from 1 to 4 atmospheres above atmospheric pressure and at a temperature of from 40° to 140° C and recovering the resulting organic phase;

removing the unreacted epihalohydrin from said organic phase by distillation at subatmospheric pressure and recovering as a residue a liquid epoxy resin having a content of hydrolyzable chlorine of from 1 to 6% by weight;

dissolving said recovered epoxy resin in an aromatic hydrocarbon or a cycloaliphatic hydrocarbon and contacting in a second stage of reaction the resulting solution with an aqueous solution of alkali metal hydroxide while maintaining an atomic ratio of alkali metal to the hydrolyzable chlorine contained in the resin of from 1:1 to 1.17:1, at a pressure of from 1 to 4 atmospheres above atmospheric pressure, at a temperature of from 80° to 140° C and with a contact time of from 10 to 80 minutes;

subjecting the reaction products of said second stage to decantation and washing with water, at a pressure of from 1 to 4 atmospheres above atmospheric pressure and at a temperature of from ambient temperature to 140° C and recovering the resulting separated organic phase; and

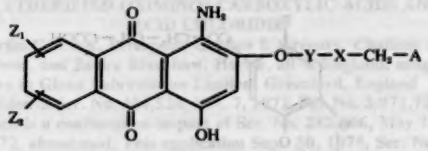
removing by distillation at subatmospheric pressure the hydrocarbon solvent from said organic phase and recovering a liquid epoxy resin with a content of hydrolyzable chlorine less than 0.02% by weight.

4,017,524
ANTHRAQUINONE DYESTUFFS

Friedrich Wilhelm Kröck, Opladen, and Rutger Neeff, Leverkusen, both of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

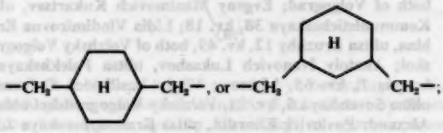
Division of Ser. No. 433,693, Jan. 16, 1974, Pat. No. 3,929,401. This application June 27, 1975, Ser. No. 590,853
Claims priority, application Germany, Jan. 16, 1973, 2301892
Int. Cl.² C07C 97/126; C09B 5/62
U.S. Cl. 260—380 9 Claims

1. Anthraquinone dyestuff of the formula



wherein

Y denotes a straight-chain or branched C_3 to C_{10}-alkylene, $-CH_2-CH_2-O-CH_2-$, $-CH_2-CH_2-O-CH_2-CH_2-$, $-CH_2-CH_2-O-(CH_2)_4-$, $-(CH_2)_3-O-CH_2-CH_2-$, $-(CH_2)_4-O-CH_2-CH_2-$, $-(CH_2)_3-O-(CH_2)_3-$, $-(CH_2)_4-O-(CH_2)_4-$, $-(CH_2)_5-O-(CH_2)_5-$, $-CH_2-CH_2-O-CH_2-CH_2-O-CH_2-CH_2-$, $-CH_2-CH_2-(O-CH_2-CH_2)_2-O-CH_2-CH_2-$,



X denotes oxygen or sulphur;

A denotes naphthyl, tetrahydronaphthyl, or phenyl substituted by 1 to 3 substituents selected from the group consisting of C_1—C_4-alkyl, trifluoromethyl, difluoromethyl, fluorine, chlorine, bromine, C_1—C_4-alkoxy, benzyl, phenyl or phenoxy radical; and

Z_1 and Z_2 denote hydrogen or halogen.

4,017,525
TETRA(NEOPHYL) ZIRCONIUM

Robert Alton Setterquist, Wilmington, Del., assignor to E. I. DuPont de Nemours and Company, Wilmington, Del.

Division of Ser. No. 471,813, May 20, 1975, Pat. No. 3,932,307. This application July 30, 1975, Ser. No. 600,296
Int. Cl.² C07F 7/00
U.S. Cl. 260—429.3 1 Claim

1. Tetra(neophyl)zirconium.

4,017,526
METAL COMPLEXES

Günther Wilke, and Ernst Willi Müller, both of Mulheim (Ruhr), Germany, assignors to Studiengesellschaft Kohle m.b.H., Mulheim (Ruhr), Germany

Division of Ser. No. 532,900, March 9, 1966, which is a division of Ser. No. 104,221, April 20, 1961, abandoned, and a continuation-in-part of Ser. No. 76,520, Dec. 19, 1960, abandoned, and Ser. No. 203,753, June 20, 1962, abandoned. This application Apr. 30, 1975, Ser. No. 573,198
Claims priority, application Germany, Dec. 22, 1959, 1593012; Apr. 28, 1960, 16427
Int. Cl.² C07F 15/04, 15/06
U.S. Cl. 260—439 CY 6 Claims

1. As a novel complex compound, dicyclooctadiene-nickel of the formula $(C_8H_{12})_2Ni$ in the form of yellow crystals.

2. As a novel complex compound, cyclooctatetraene-nickel of the formula C_8H_8Ni in the form of black-colored needles having metallic lustre.

3. As a novel complex compound, all-trans-cycle-dodeca-(1,5,9)-triene-centro-nickel in the form of pure red crystals.

4. As a novel complex compound, cyclooctadiene-nickel-acetylacetone of the formula $C_{13}H_{20}O_2Ni$ in the form of orange-colored crystals.

5. As a novel complex compound, tris(stilbene) nickel of the formula $Ni(C_{14}H_{12})_2$ in the form of brown crystals.

4,017,527
METALLIC-ORGANO-PEROXIDE AND ORGANO-METALLIC-PEROXIDE

George G. Merkl, 46 Sunset Court, Haworth, N.J. 07641

Division of Ser. No. 319,293, Dec. 29, 1972, Pat. No. 3,969,387. This application Oct. 15, 1974, Ser. No. 514,681
Int. Cl. C07F 5/06
U.S. Cl. 260—448 AD 21 Claims

1. A method of forming a peroxy compound which comprises contacting and reacting:
   a. reactive aluminum comprising highly pure aluminum permeated with a metal having an atomic volume close to hydrogen; with
   b. a liquid mixture of
      i. hydrogen peroxide; and
      ii. a member selected from alcohols, ketones, and aldehydes; and

separating the peroxy compound from unreacted reactive aluminum.

19. A method of forming a peroxy compound which comprises contacting and reacting:
   a. a reactive aluminum comprising highly pure aluminum permeated with a liquid metal selected from mercury, gallium and indium/gallium alloys; with
   b. a liquid mixture of
      i. hydrogen peroxide; and
      ii. a member selected from methyl acrylate, ethyl oxalate, ethyl alcohol, isopropyl alcohol, butyl alcohol, acetone, methyl ethyl ketone and acetaldehyde; and

separating the peroxy compound from unreacted reactive aluminum.

4,017,528
PREPARATION OF ORGANICALLY MODIFIED SILICON DIOXIDES

Klaus Unger, Darmstadt, and Jürgen Schick-Kalb, Eichenzell near Fulda, both of Germany, assignors to Merck Patent Gesellschaft mit beschrankter Haftung, Darmstadt, Germany

Filed Nov. 11, 1974, Ser. No. 522,982
Claims priority, application Germany, Nov. 16, 1973, 2357184
Int. Cl.² C07F 7/04
U.S. Cl. 260—448.8 R 10 Claims

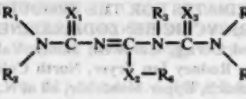
1. In a process for the production of a porous silicon dioxide bearing organosilyl groups on the surface thereof by the hydrolytic polycondensation of a tetraalkoxysilane or a polyalkoxysiloxane in the heterogeneous phase, the improvement which comprises conducting the hydrolytic polycondensation in the presence of a monomeric organoalkoxysilane, the organogroup of which is not hydrolyzable under conditions of said hydrolytic polycondensation, thereby producing a porous silicon dioxide bearing organic groups which are part both of the skeleton structure and the surface of the porous silicon dioxide.

4,017,529
HERBICIDAL ALLOPHANIMIDATES

Julius Jakob Fuchs, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Division of Ser. No. 268,768, July 3, 1972, Pat. No. 3,879,190, which is a continuation-in-part of Ser. No. 256,254, May 24, 1972, abandoned, which is a continuation-in-part of Ser. No. 181,203, Sept. 16, 1971, abandoned. This application Feb. 27, 1975, Ser. No. 553,628
Int. Cl.² C07C 119/18, 119/20
U.S. Cl. 260—453 R 12 Claims

1. Compounds of the formula:



wherein:

R_1, R_2, R_4 and R_5 are each independently selected from the group consisting of hydrogen; alkyl of 1 through 8 carbon atoms; alkenyl of 3 through 4 carbon atoms; cycloalkyl of 3 through 8 carbon atoms; cycloalkenyl of 5 through 8 carbon atoms; cycloalkylalkyl of 4 through 10 carbon atoms; bicycloalkyl of 7 through 10 carbon atoms; hydrocarbyl arylalkyl of 5 through 9 carbon atoms; alkynyl of 3 through 4 carbon atoms; methoxy; phenyl; the above alkyl and alkenyl groups substituted with 1 through 3 chlorines, bromine, iodine, 1 through 7 fluorines, methoxy, ethoxy, methylthio, ethylthio, cyano, or acetyl; the above cycloalkyl and bicycloalkyl groups substituted with 1 through 3 chlorines, bromine, 1 or 2 methyls, or alkyl of 2 through 4 carbon atoms; phenyl substituted with 1 or 2 chlorines, 1 or 2 bromines, fluorine, nitro, cyano, alkyl of 1 through 4 carbon atoms, methoxy, or trifluoromethyl; and the above hydrocarbyl arylalkyl groups substituted with 1 chlorine or 1 methyl;

R_3 is hydrogen; alkyl of 1 through 4 carbon atoms; alkynyl of 3 through 4 carbon atoms; or alkenyl of 3 through 4 carbon atoms;

R_6 is alkyl of 1 through 8 carbon atoms; cycloalkyl of 5 through 8 carbon atoms; alkenyl of 3 through 8 carbon atoms; phenyl; or benzyl; and

X_1, X_2, and X_3 are each independently selected from oxygen and sulfur;

provided that:

a. at least one of R_1, R_2, R_4 and R_5 is other than hydrogen;
b. no more than one of R_1, R_2, R_4 and R_5 is phenyl, substituted phenyl; hydrocarbyl arylalkyl or substituted hydrocarbyl arylalkyl;
c. the total number of carbon atoms in R_1 and R_2 does not exceed 10;
d. the total number of carbon atoms in R_4 and R_5 does not exceed 10;
e. R_1 and R_2 are not both methoxy;
f. R_4 and R_5 are not both methoxy;
g. when R_6 is normal alkyl of 3 through 8 carbon atoms, cycloalkyl of 6 through 8 carbon atoms and benzyl, and R_3 is hydrogen, and one of R_1, R_2, R_4 and R_5 is phenyl, then only one of the other R_1, R_2, R_4 and R_5 can be other than hydrogen; and
h. when one of R_1, R_2, R_4 and R_5 is 2,5-dichlorophenyl and R_3 is hydrogen, then only one of the other R_1, R_2, R_4 and R_5 can be other than hydrogen;

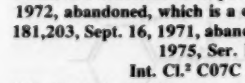
and the alkali metal, alkaline earth and ammonium salts of the above compounds in which R_3 is hydrogen.

4,017,530
PHENOXY SUBSTITUTED THIOLCARBOXYLIC ACID AMINO ACID SUBSTITUTED ESTERS

Jean Blum, 20 Ter rue de Bezons, Appt. 2275, 92 400 Courbevoie, France

Continuation-in-part of Ser. No. 465,306, April 29, 1974, abandoned. This application Apr. 3, 1975, Ser. No. 564,633
Claims priority, application France, May 4, 1973, 73.16162
Int. Cl.² C07C 153/07
U.S. Cl. 260—455 R 3 Claims

1. A compound N-acetylhomocysteine-S-parachlorophenoxy-2-isobutyrate of the formula



$ClC_6H_4OC(CH_3)_2COSCH_2CH_2CH(COOH)NHCOCH_3$

and esters thereof.

4,017,531
INTERMEDIATES FOR THE PRODUCTION OF TRICYCLIC BENZODIAZEPINES

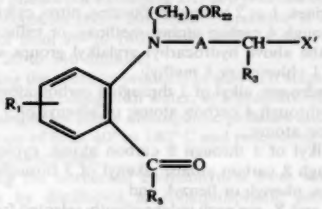
Michael Edward Derieg, Caldwell; James Valentine Earley, Cedar Grove; Rodney Ian Fryer, North Caldwell, and Leo Henryk Sternbach, Upper Montclair, all of N.J., assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Division of Ser. No. 557,438, March 11, 1975, Pat. No. 3,965,151, which is a division of Ser. No. 45,928, June 12, 1970, abandoned, which is a continuation-in-part of Ser. No. 26,068, April 6, 1970, Pat. No. 3,905,956, which is a continuation-in-part of Ser. No. 863,377, Oct. 2, 1969, abandoned, which is a continuation-in-part of Ser. No. 768,909, Oct. 18, 1968, abandoned. This application Apr. 12, 1976, Ser. No. 676,077

Int. Cl.² C07C *69/96*

U.S. Cl. 260—463 1 Claim

1. Compounds of the formula



wherein R_1 is hydrogen, nitro, trifluoromethyl, halogen, lower alkyl, lower alkyl mercapto or lower alkoxy; R_3 is hydrogen; R_5 is phenyl and phenyl substituted with a member selected from the grop consisting of halogen, nitro, trifluoromethyl and lower alkyl; R_{22} is carbobenzoxy; m is an integer from 1–7; A is selected from the group consisting of $-CH_2-$ and

and X′ is chlorine, bromine or iodine.

4,017,532
INTERMEDIATES FOR THE PRODUCTION OF TRICYCLIC BENZODIAZEPINES

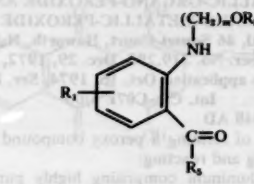
Michael Edward Derieg, Caldwell; James Valentine Earley, Cedar Grove; Rodney Ian Fryer, North Caldwell, and Leo Henryk Sternbach, Upper Montclair, all of N.J., assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Division of Ser. No. 557,438, March 11, 1975, Pat. No. 3,965,151, which is a division of Ser. No. 45,928, June 12, 1970, abandoned, which is a continuation-in-part of Ser. No. 26,068, April 6, 1970, Pat. No. 3,905,956, which is a continuation-in-part of Ser. No. 863,377, Oct. 2, 1969, abandoned, which is a continuation-in-part of Ser. No. 768,909, Oct. 18, 1968, abandoned. This application Apr. 12, 1976, Ser. No. 676,092

Int. Cl.² C07C *69/96*

U.S. Cl. 260—463 1 Claim

1. Compounds of the formula



wherein R_1 hydrogen, nitro, trifluoromethyl, halogen, lower alkyl, lower alkyl mercapto or lower alkoxy; R_5 is phenyl and phenyl substituted with a member selected from the group consisting of halogen, nitro, trifluoromethyl and lower alkyl; R_{22} is carbobenzoxy; and m is an integer from 1–7.

4,017,533
DIAMINOMALEONITRILE DERIVATIVES AND PROCESSES FOR PREPARING THE SAME

Yozo Ohtsuka, Sagamihara, Japan, assignor to Sagami Chemical Research Center, Tokyo, Japan

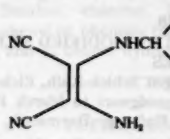
Filed Dec. 29, 1975, Ser. No. 645,179

Claims priority, application Japan, Dec. 27, 1974, 49-148714; Dec. 27, 1974, 49-148715

Int. Cl.² C07C *120/00, 121/45, 121/78, 121/84*

U.S. Cl. 260—465 E 5 Claims

1. N-α-Cyanoalkyl compounds of diaminomaleonitrile represented by the formula (I)



(I)

wherein R represents a straight or branched chain alkyl group having 1 to 4 carbon atoms or a phenyl group.

4,017,534
16-FLUORO-11-DEOXY-13-DIHYDRO-PROSTAGLANDIN

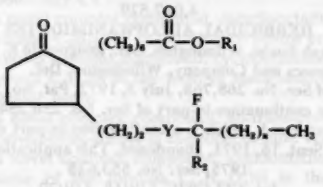
Robert Eugene Schaub, Upper Saddle River, N.J.; Middleton Brawner Floyd, Jr., Suffern, N.Y., and Martin Joseph Weiss, Oradell, N.J., assignors to American Cyanamid Company, Stamford, Conn.

Division of Ser. No. 475,479, June 3, 1974, Pat. No. 3,932,463, which is a continuation-in-part of Ser. No. 263,036, June 15, 1972, abandoned, which is a continuation-in-part of Ser. No. 95,911, Dec. 7, 1970, abandoned. This application Oct. 14, 1975, Ser. No. 621,919

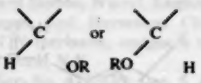
Int. Cl.² C07C *177/00*

U.S. Cl. 260—468 D 13 Claims

1. A compound selected from the group consisting of an optically active compound of the formula:



and a racemic compound of that formula and the mirror image thereof wherein Y is a divalent moiety of the formulae:



wherein R is hydrogen or lower alkanoyl; *n* is an integer from 2 to 5, inclusive; R_1 is hydrogen or alkyl having from one to 12 carbon atoms; R_2 is hydrogen or fluorine; and the pharmacologically acceptable cationic salts thereof when R_1 is hydrogen.

4,017,535

SUBSTITUTED TOLYL ESTERS OF 16-SUBSTITUTED-PGE$_2$-TYPE COMPOUNDS

Walter Morozowich, Kalamazoo, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

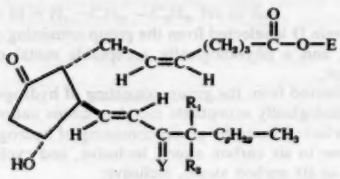
Division of Ser. No. 523,568, Nov. 14, 1974. This application Nov. 21, 1975, Ser. No. 634,118

The portion of the term of this patent subsequent to July 8, 1992, has been disclaimed.

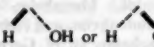
Int. Cl.² C07C *177/00*

U.S. Cl. 260—468 D **7 Claims**

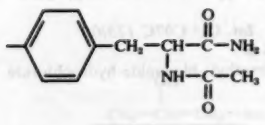
1. An optically active compound of the formula

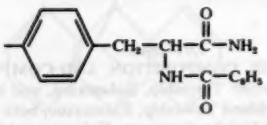


or a racemic mixture of that compound and the enantiomer thereof, wherein C_9H_{18} is alkylene of one to 9 carbon atoms, inclusive, in the chain between $-CR_1R_2-$ and terminal methyl; R_1 and R_2 are hydrogen, methyl, ethyl, or fluoro, being the same or different, with the proviso that at least one of R_1 and R_2 is other than hydrogen, and with the further proviso that R_2 is fluoro only when R_1 is hydrogen or fluoro; Y is

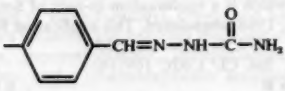


and E is





or



4,017,536

ETHER AND THIOETHER CONTAINING THIOLESTERS

Friedrich Karrer, Basel, and Saleem Farooq, Aesch, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

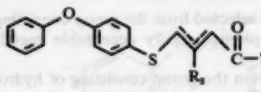
Division of Ser. No. 521,314, Nov. 6, 1974, Pat. No. 3,900,507. This application May 27, 1975, Ser. No. 581,070

Claims priority, application Switzerland, Nov. 9, 1973, 15812/73; Nov. 9, 1973, 15813/73; Oct. 9, 1974, 13565/74

Int. Cl.² C07C *149/40*

U.S. Cl. 260—470 **3 Claims**

1. Compounds of the formula



wherein

R_1 represents C_1–C_4-alkyl,

R_2 represents methyl or ethyl, and W represents oxygen.

4,017,537

NONCATALYZED ALDOL REACTION

Anthony W. McCollum, and Hugh J. Hagemeyer, Jr., both of Longview, Tex., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Aug. 25, 1975, Ser. No. 607,160

Int. Cl.² C07C *67/08*, *67/44*

U.S. Cl. 260—494 **5 Claims**

1. The process for preparing beta-acyloxyaldehydes comprising reacting at a temperature from about 150° C. to about 280° C., formaldehyde, an aldehyde having the formula

wherein R^1 and R^2 are each selected from hydrogen, alkyl of 1–12 carbons, and phenyl, and, in the absence of any other acid, an acid having the formula RCOOH wherein R is alkyl of 1–12 carbons or phenyl.

4,017,538

ALKYL THIO SULFINYL AND SULFONYL OXAMIC COMPOUNDS, COMPOSITIONS AND METHODS OF USE

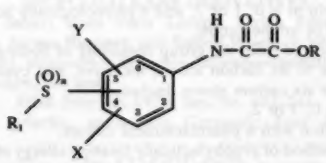
Charles M. Hall, and John B. Wright, both of Kalamazoo, Mich., assignors to The Upjohn Company, Kalamazoo, Mich.

Filed Oct. 1, 1975, Ser. No. 618,509

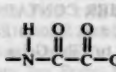
Int. Cl.² C07C *101/78*; A61K *31/24*

U.S. Cl. 260—518 R **12 Claims**

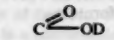
1. A compound of the formula



wherein X is at the 3 or 4 position and is hydrogen or



Y is selected from the group consisting of hydrogen, alkyl of one to four carbon atoms, inclusive, halo, hydroxy, cyano, nitro, trifluoromethyl,



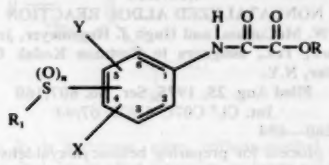
wherein D is selected from the group consisting of hydrogen, and a physiologically acceptable metal or amine cation,

R is selected from the group consisting of hydrogen, and a physiologically acceptable metal or amine cation;

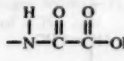
R_1 is selected from the group consisting of hydrogen, alkyl of one to six carbon atoms, inclusive, and cycloalkyl of five or six carbon atoms, inclusive;

and *n* is 0, 1 or 2.

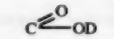
10. A pharmaceutical composition which comprises an anti-allergy effective amount of a compound of the formula



wherein X is at the 3 or 4 position and is hydrogen or

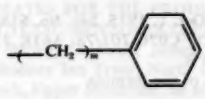


Y is selected from the group consisting of hydrogen, alkyl of one to four carbon atoms, inclusive, halo, hydroxy, cyano, nitro, trifluoromethyl,



wherein D is selected from the group consisting of hydrogen, and a physiologically acceptable metal or amine cation,

R is selected from the group consisting of hydrogen,



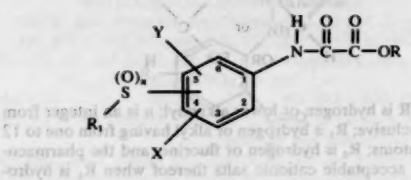
wherein *m* is 0, 1 or 2, and a physiologically acceptable metal or amine cation;

R_1 is selected from the group consisting of hydrogen, alkyl of one to six carbon atoms, inclusive, and cycloalkyl of five or six carbon atoms, inclusive;

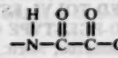
and *n* is 0, 1 or 2,

in association with a pharmaceutical carrier.

11. A method of prophylactically treating allergy of a reagin or non-reagin mediated nature in a mammal which comprises the administration of an anti-allergy effective amount of a compound of the formula



wherein X is at the 3 or 4 position and is hydrogen or



Y is selected from the group consisting of hydrogen, alkyl of one to four carbon atoms, inclusive, halo, hydroxy, cyano, nitro, trifluoromethyl,

wherein D is selected from the group consisting of hydrogen, and a physiologically acceptable metal or amine cation,

R is selected from the group consisting of hydrogen, and a physiologically acceptable metal or amine cation;

R_1 is selected from the group consisting of hydrogen, alkyl of one to six carbon atoms, inclusive, and cycloalkyl of five or six carbon atoms, inclusive;

and *n* is 0, 1 or 2.

4,017,539

BIGUANIDE COMPOUNDS AND ANTI-DIABETIC COMPOSITIONS

Elmar Bosies, Heppenheim; Kurt Stach, Mannheim-Waldhof; Felix Helmut Schmidt, Mannheim-Seckenheim; Ruth Heerdt, Mannheim-Feudenheim, and Helmut Weber, Frankfurt am Main-Schwanheim, all of Germany, assignors to Boehringer Mannheim G.m.b.H., Mannheim-Waldhof, Germany

Filed May 7, 1975, Ser. No. 575,098

Claims priority, application Germany, June 1, 1974, 2426683

Int. Cl.² C07C *123/00*

U.S. Cl. 260—564 B **1 Claim**

1. 1-(cyclobutylmethyl)-biguanide-hydrochloride.

4,017,540

METHOD OF USE, COMPOSITION, AND COMPOUNDS

Girts Kaugars, Cooper Township, Kalamazoo, and Edwin G. Gemrich, II, Richland Township, Kalamazoo, both of Mich., assignors to The Upjohn Company, Kalamazoo, Mich.

Continuation-in-part of Ser. No. 779,251, Nov. 26, 1968, Pat. No. 3,879,543, which is a continuation-in-part of Ser. No. 709,943, March 4, 1968, abandoned. This application Feb. 22, 1972, Ser. No. 228,359

Int. Cl.² C07C *109/16*

U.S. Cl. 260—566 B **6 Claims**

1. p-toluoyl chloride phenylhydrazone.

4,017,541
ORGANIC BUILDER

Christopher Edward Stubbs, Wirral, England; Jacobus Roelof Nooi, Vlaardingen, and Hermanus Christoffel Kemper, Brielle, both of Netherlands, assignors to Lever Brothers Company, New York, N.Y.

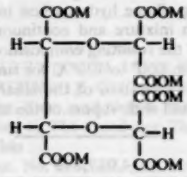
Continuation of Ser. No. 422,039, Dec. 5, 1973, abandoned. This application Sept. 15, 1975, Ser. No. 613,677

Claims priority, application United Kingdom, Dec. 7, 1972, 56514/72

Int. Cl.² C07C *59/14*

U.S. Cl. 260—535 P 1 Claim

1. Novel tartaric acid dimalonyl ethers, useful as builders in detergent compositions, of the following formula:



in which M = H, $-CH_3$, $-C_2H_5$, Na or K.

4,017,542
9-(2-HYDROXY-3-AMINO-PROPYL)-9,10-DIHYDRO-9,10-ETHANO-ANTHRACENES AND SALTS THEREOF

Max Wilhelm, Watchung, N.J.; Raymond Bernasconi, Oberwil, Switzerland; Angelo Storni, Rheinfelden, Switzerland; Dieter Beck, Basel, Switzerland, and Karl Schenker, Binningen, Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

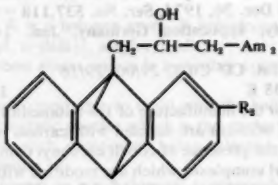
Continuation-in-part of Ser. No. 226,329, Feb. 14, 1972, abandoned. This application Apr. 2, 1975, Ser. No. 564,580

Claims priority, application Switzerland, Feb. 23, 1971, 2578/71; Feb. 17, 1972, 669/72

Int. Cl.² C07C *91/22*

U.S. Cl. 260—570.6 5 Claims

1. A compound selected from the group consisting of a compound of the formula



(III)

wherein R_2 represents a member selected from the group consisting of trifluoromethyl, chloro and hydrogen, and Am_2 denotes a member selected from the group consisting of diethylamino, monoethylamino, dimethylamino and monomethylamino, and a pharmaceutically acceptable acid addition salt thereof.

4,017,543
α,α-DIALKYL-4-PHENETHYL-BENZYLAMINES AND THE SALTS THEREOF

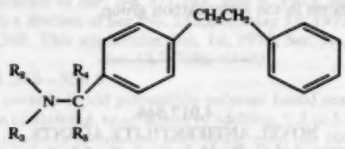
Marcia Elizabeth Christy, Perkasie, Pa., assignor to Merck & Co., Inc., Rahway, N.J.

Continuation of Ser. No. 426,170, Dec. 19, 1973, abandoned, which is a continuation-in-part of Ser. No. 205,708, Dec. 7, 1971, abandoned, which is a continuation-in-part of Ser. No. 106,389, Jan. 15, 1971, abandoned. This application Oct. 23, 1975, Ser. No. 625,279

Int. Cl.² C07C *87/28*

U.S. Cl. 260—570.8 R 9 Claims

1. A compound of the formula



wherein

R_2 and R_3 are each members of the group consisting of hydrogen and loweralkyl and

R_4 and R_5 are loweralkyl substituents of from 1–3 carbon atoms;

or a derivative of said compound in which one of the hydrogens of the benzene ring is replaced by halogen, loweralkyl, loweralkoxy, perfluoroloweralkyl, loweralkylmercapto or loweralkysulfonyl.

4,017,544
N-(NITROALKYL)-N'-PHENYL-p-PHENYLENEDIAMINES

Darrell Dexter Mullins, Norton, Ohio, assignor to Monsanto Company, St. Louis, Mo.

Division of Ser. No. 435,676, Jan. 23, 1974, Pat. No. 3,896,162. This application Apr. 17, 1975, Ser. No. 569,119

Int. Cl.² C07C *87/64*, *93/14*, *69/54*

U.S. Cl. 260—576 2 Claims

1. A compound of the formula

in which R and R' are independently lower alkyl.

4,017,545
PROCESS FOR THE PREPARATION OF BICYCLOALKANE DERIVATIVES

Gerhard Sauer; Hans Peter Lorenz; Ulrich Eder; Gregor Haffer; Jurgen Ruppert, and Rudolf Wiechert, all of Berlin, Germany, assignors to Schering Aktiengesellschaft, Berlin & Bergkamen, Germany

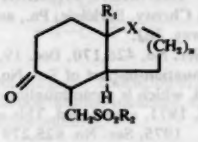
Filed June 20, 1974, Ser. No. 481,241

Claims priority, application Germany, June 21, 1973, 2331997

Int. Cl.² C07C *49/76*

U.S. Cl. 260—590 FA 13 Claims

1. A bicycloalkane of the formula



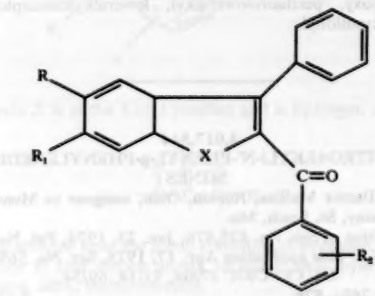
wherein *n* is the integer 1 or 2; R_1 is alkyl of 1–4 carbon atoms inclusive; R_2 is alkyl, mono- or dicyclic carbocyclic aryl or aralkyl, each of up to 12 carbon atoms, X is β-hydroxymethylene, 1-β-alkoxymethylene wherein alkoxy is of 1–4 carbon atoms or 1-β-hydrocarboncarbonyloxymethylene of 1–10 carbon atoms in the hydrocarbon group.

4,017,546
NOVEL ANTIFERTILITY AGENTS

Tulio Suarez, and C. David Jones, both of Indianapolis, Ind., assignors to Eli Lilly and Company, Indianapolis, Ind.

Filed Oct. 28, 1975, Ser. No. 625,992
Int. Cl.² C07C *49/76*
U.S. Cl. 260—591 **13 Claims**

1. A compound of the formula



in which X is $—CH_2—$, $—CH_2—CH_2—$ or $—CH=CH—$; R and R_1 independently are hydrogen, hydroxyl, $C_1—$ to $C_5—$alkoxy, or $C_5—$ to $C_6—$cycloalkoxy; subject to the limitation that at least one of R and R_1 is hydrogen; and R_2 is hydrogen, chloro, bromo, hydroxyl, $C_1—$ to $C_5—$alkoxy, or $C_5—$ to $C_6—$cycloalkoxy; subject to the limitation that at least one of R, R_1, or R_2 is other than hydrogen.

4,017,547
OXIDATION OF p-XYLENE TO TEREPHTHALALDEHYDE

Kenneth E. Simmons, and James E. Williams, both of Kingsport, Tenn., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Sept. 8, 1975, Ser. No. 611,381
Int. Cl.² C07C *45/02*
U.S. Cl. 260—599 **7 Claims**

1. In a process for preparing terephthalaldehyde by the vapor phase oxidation of p-xylene in the presence of a supported catalyst mixture of molybdenum in the form of an oxide and tungsten in the form of an oxide or silicotungstic acid, the improvement which comprises employing an oxide of bismuth on the supported catalyst.

4,017,548
BORONTRIFLUORIDE RECOVERY FROM ALKYL PHENOL MIXTURE

Dennis G. Petrille, Batavia, Ill., assignor to Standard Oil Company (Indiana), Chicago, Ill.

Filed Oct. 6, 1975, Ser. No. 619,789
Int. Cl.² C07F *5/02*
U.S. Cl. 260—606.5 B **7 Claims**

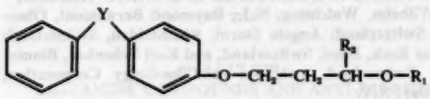
1. A process for continuous removal of BF_3 from the viscous fluid alkylation reacton mixture obtained by the reaction at a temperature in the range of 45°–60° C of phenol with a 500–3000 M_n viscous liquid polymer of propylene or butylene in the presence of BF_3-phenolate catalyst and mineral oil of the crankcase lubricating viscosities, wherein for each mole of said polymer there is used 1–6 moles of phenol and 0.05 to 0.5 mole of said catalyst and mineral oil in an amount of 30–70 weight percent of said polymer; which BF_3 removal process comprises continously dissolving 6 to 25 weight percent of 80°–125° C boiling alkane hydrocarbon in the viscous liquid alkylation reaction mixture and continuously heating incremental portions of the resulting composition to a temperature in the range of from 100° to 130° C for simultaneous catalyst dissociation and vaporization of the alkane to strip BF_3 gas from the heated fluid with vapors of the alkane.

4,017,549
DIPHENYLMETHANE ETHER DERIVATIVES

Friedrich Karrer, Basel, and Saleem Farooq, Aesch, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Oct. 20, 1975, Ser. No. 623,876
Claims priority, application Switzerland, Oct. 24, 1974, 14246/74; Sept. 23, 1975, 12337/75
The portion of the term of this patent subsequent to May 18, 1993, has been disclaimed.
Int. Cl.² C07C *43/20*
U.S. Cl. 260—613 R **5 Claims**

1. A compound of the formula I



(I)

wherein

R_1 represents a C_3–C_5-alkenyl, C_3–C_5-chloroalkenyl or C_3–C_5-alkynyl radical,

R_2 represents a hydrogen atom or a methyl radical, and

Y represents a methylene group.

4,017,550
MANUFACTURE OF 1,4-BUTANEDIOL

Rudolf Kummer, Frankenthal, Germany, assignor to BASF Aktiengesellschaft, Ludwigshafen (Rhine), Germany

Filed Dec. 30, 1974, Ser. No. 537,118
Claims priority, application Germany, Jan. 14, 1974, 2401553
Int. Cl.² C07C *29/00, 29/16*
U.S. Cl. 260—635 E **18 Claims**

1. A process for the manufacture of 1,4-butanediol, wherein cyclic acetals of acrolein are reacted with carbon monoxide and hydrogen in the presence of cobalt carbonyl complexes or rhodium carbonyl complexes which are modified with tertiary organic phosphines, at temperatures of from 80° to 200° C under superatmospheric pressure, and the resulting 3-formylpropionaldehyde-acetals and the 4-hydroxybutyraldehyde-acetals produced are hydrogenated in the presence of water at 70°–150° C and under superatmospheric pressure in the presence of a hydrogenation catalyst containing a metal of group 8 of the Periodic Table or copper as a catalytically active metal.

4,017,551
LIQUID PHASE CHLORINATION OF AROMATIC HYDROCARBONS USING MANGANESE CHLORIDE CATALYST

Joseph E. Milam, New Martinsville, W. Va., and Gordon A. Carlson, Wadsworth, Ohio, assignors to PPG Industries, Inc., Pittsburgh, Pa.

Filed Jan. 27, 1975, Ser. No. 544,244
Int. Cl.² C07C *25/08*
U.S. Cl. 260—650 R **14 Claims**

1. A process for preparing a dichlorobenzene product having a mole ratio of paradichlorobenzene to orthodichlorobenzene below 1.35, which comprises reacting benzene or monochlorobenzene and elemental chlorine in the liquid phase, in the presence of a catalytically effective amount of a manganese chloride catalyst composition, at a temperature between about 27° C. to about 74° C., the reaction media having an iron concentration not above about 3 parts per million.

4,017,552
BICYCLO-[3'3'0]-OCTA-2-ENE FORMED BY ISOMERIZING 1,5-CYCLOOCTADIENE

Henry R. Menapace, Stow, and Neil A. Maly, Tallmadge, both of Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio

Continuation of Ser. No. 219,527, Jan. 20, 1972, abandoned. This application Mar. 7, 1973, Ser. No. 338,771
Int. Cl.² C07E *13/00*
U.S. Cl. 260—666 PY **2 Claims**

1. A process which comprises isomerizing 1,5-cyclooctadiene to bicyclo-[3.3.0]-octa-2-ene by contacting 1,5-cyclooctadiene with a catalyst of (1) a soluble nickle compound selected from at least one of the group consisting of nickel salts of carboxylic acids and (2) a co-catalyst selected from at least one of the group consisting of alkylaluminum dichloride, alkylaluminum sesquichloride and aluminum trichloride.

4,017,553
PROCESS FOR THE PREPARATION OF LINEAR ALPHA-OLEFIN OLIGOMERS, SUBSEQUENT HYDROGENATION THEREOF AND SATURATED PRODUCTS THUS OBTAINED

Sebastiano Cesca; Aldo Priola, and Giuseppe Ferraris, all of San Donato Milanese (Milan), Italy, assignors to Snam Progetti, S.p.A., San Donato Milanese, Italy

Filed Aug. 1, 1975, Ser. No. 601,186
Claims priority, application Italy, Aug. 2, 1974, 25939/74
Int. Cl.² C07C *3/10*
U.S. Cl. 260—683.15 D **16 Claims**

1. Process for the preparation of oligomers from linear alpha-olefins having a carbon atom number of from 3 to 12 characterized in that the reaction is carried out in the presence of a catalyst system constituted by:

a. an aluminum metallorganic halide compound having the following general formula

R_mAlX_{3-m}

in which X is a halogen atom, R is hydrogen, an alkyl, aryl, cycloalkyl, arylalkyl, alkylaryl, alkoxy, ester radical having 1 to 12 carbon atoms and m is a number comprised between 1 and 3;

b. A compound able to react with the halide of (a) to give the catalytic species which is the starter of the polymerization such compound being selected from the group consisting of:

I. halogens or interhalogenic compounds having the general formula X'Y in which X' and Y, the same or different, are selected among chlorine, bromine, iodine and fluorine,

II. metal halides having the general formula

$MeX''_nY'_m$

in which X'' is a halogen atom or anion chosen among ClO_4^-, HSO_4^-, NO_3^-, NO_2^-, ClO_3^-, Y' is oxygen or sulphur, or a functional group chosen among the alcoxi, ester, amide, alkyl, cycloalkyl, aromatic, either simple or substituted, groups, Me is a metal element chosen among Si, B, Be, Sb, As, Bi and Mg; m_1 is a whole number, even if equal to zero, n too is a whole number and the sum thereof is equal to the Me valence, apart from Y' is oxygen or sulphur, where the valence is expressed by $2m_1 + n$.

4,017,554
EPOXIDE MODIFIED POLYSULFIDE POLYMERS AS ADHESIVE ADDITIVES FOR LIQUID POLYSULFIDE POLYMER BASED ADHESIVE COMPOSITIONS

Jose L. Villa, Heightstown, N.J., assignor to Thiokol Corporation, Newtown, Pa.

Continuation of Ser. No. 377,161, July 6, 1973, abandoned, which is a division of Ser. No. 252,646, May 12, 1972, Pat. No. 3,813,368. This application Oct. 14, 1975, Ser. No. 622,339
Int. Cl.² C08L *63/00*
U.S. Cl. 260—830 S **6 Claims**

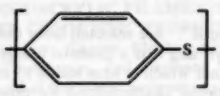
1. A curable liquid polysulfide polymer based sealant composition containing, as an adhesive additive, 0.5 to 5.0 parts by weight of epoxy terminated polysulfide resin per 100 parts by weight of curable liquid polysulfide polymer.

4,017,555
POLYALLOY OF POLYPHENYLENE SULFIDE AND POLYIMIDE

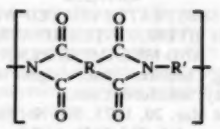
Robert T. Alvarez, 13382 Flint Drive, Santa Ana, Calif. 92705

Filed June 21, 1976, Ser. No. 698,441
Int. Cl.² C08L *77/00*
U.S. Cl. 260—857 PA **2 Claims**

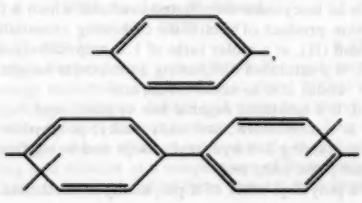
1. A polymeric alloy of polyphenylene sulfide having recurring units of the formula:



wherein n is a positive integer selected to result in a polymer which is thermally stable at at least about 200° C. and a polyimide having recurring units of the formula



wherein R is a tetravalent aromatic radical containing at least one ring of six carbon atoms, said ring characterized by benzenoid unsaturation, the four carbonyl groups being attached directly to separate carbon atoms in a benzene ring of the R radical and each pair of carbonyl groups being attached to adjacent carbon atoms in a benzene ring of the R radical; and wherein R' is a divalent benzenoid radical selected from the group consisting of



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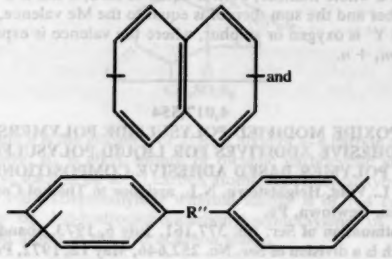
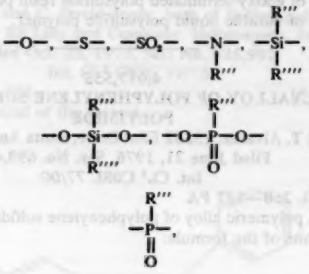


wherein R'' is selected from the group con-alkylene chain having 1–3 carbon atoms,

and



wherein R''' and R'''' are selected from the group consisting of alkyl and aryl, and *n* is a positive integer high enough to result in a polymer which is heat stable to at least about 200° C., said alloy being characterized by possessing melt flow properties at temperatures about about 300° C.

4,017,556

POLYMERIC SUBSTRATES COATED WITH REACTION PRODUCT OF HYDROXY-TERMINATED URETHANE AND MELAMINE RESIN

Samuel S. Wang, Cheshire, Conn., assignor to American Cyanamid Company, Stamford, Conn.

Filed Mar. 20, 1975, Ser. No. 560,416
Int. Cl.² C08L *61/28*
U.S. Cl. 260—856 **10 Claims**

1. An article of manufacture comprising a polymeric substrate having a mar-resistant coating thereon, said coating consisting essentially of the acid catalyzed reaction product of a mixture of (1) and (2), in an amount ranging from about 5:1 to about 1:1, respectively, in which

1. is a saturated urethane prepolymer having terminal hydroxy groups which is the reaction product of materials consisting essentially of a mixture of (a) and (b), at a molar ratio of 1:2, respectively, in which
   a. is an isocyanate-terminated urethane which is the reaction product of a mixture consisting essentially of (I) and (II), at a molar ratio of 1:2, respectively, in which
      i. is a saturated diol having a molecular weight of from about 200 to about 3000, and
      ii. is a saturated organic iso- cyanate, and
   b. is a monomeric, sterically bulky, polyhydric alcohol containing 2–6 hydroxyl groups and being free of oxyalkylene units and
2. is a polyalkyl ether of a polymethylol melamine.

4,017,557

NOVEL ELASTOMERIC GRAFT COPOLYMERS

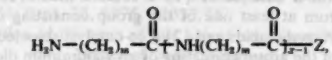
Clarence Frederick Hammer, Wilmington, Del., and Harold King Sinclair, Louisville, Ky., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Nov. 13, 1974, Ser. No. 523,465
The portion of the term of this patent subsequent to Aug. 3, 1993, has been disclaimed.
Int. Cl.² C08L *77/00*
U.S. Cl. 260—857 G **15 Claims**

1. An elastomeric, thermoplastic graft copolymer consisting essentially of

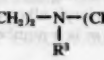
A. an elastomeric trunk copolymer derived from at least two monomers, at least one of said monomers providing amine-reactive sites selected from the class consisting of an anhydride group, a vicinal pair of carboxylic groups, and a carboxylic group adjacent to an alkoxy-, phenoxy-, napthoxy-, substituted phenoxy-, or substituted naphthoxycarbonyl group, where the alkyl of the alkoxycarbonyl group has 1-10 carbon atoms, and the substituents of substituted phenoxycarbonyl and naphthoxycarbonyl groups can be a C_1-C_{10} alkyl, halogen, or a C_1-C_{10} alkoxy group; at least one of said monomers containing no amine-reactive sites and none of said monomers containing hydroxyl or amino groups; and

B. a side chain polymer derived from a short chain polyamide represented by the formula



where Z is

R^1 and R^2 being independently selected from hydrogen, a C_1–C_{18} alkyl, benzyl, and C_5-C_6 cycloalkyl; or taken together, being $—(CH_2)_4—$, $—(CH_2)_5—$, $—(CH_2)_2—O—(CH_2)_2—$, or



where R^3 is a C_1-C_6 alkyl; with the proviso that only one of R^1 and R^2 can be hydrogen;

m is 5 and 11; and

x is a positive number having an average value of 5–60;

said side chain polymer being attached to said trunk copolymer through amide or imide linkages resulting from a reaction of the terminal primary amino group of said short chain polyamide with the amine-reactive sites of said trunk copolymer;

the proportion of said elastomeric trunk copolymer in the graft copolymer being about 45–85 weight percent.

4,017,558

THERMOPLASTIC MOLDING COMPOSITIONS OF HIGH IMPACT RESISTANCE

Franz Schmidt, Mannheim; Gerhard Fahrbach, Plankstadt; Wolfgang Schenk, Schwetzingen, and Erhard Seiler, Freiburg, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Germany

Filed Feb. 13, 1975, Ser. No. 549,678

Claims priority, application Germany, Feb. 22, 1974, 2408487

Int. Cl.² C08L *53/00*

U.S. Cl. 260—876 B 2 Claims

1. Impact-resistant thermoplastic molding compositions comprising a blend of from 70 to 98 percent by weight of a polyoxymethylene and from 30 to 2 percent by weight of a block copolymer of the formula A—B—A, wherein A is a polyethylene oxide block and B is a diene polymer block, said diene polymer block being a homopolymer of butadiene, a copolymer of butadiene and isoprene, a copolymer of butadiene and styrene showing random distribution of the monomers, or a copolymer of butadiene and styrene showing a block structure, said diene polymer B containing at least 30 percent by weight of diene hydrocarbon, said block B having a molecular weight of from 20,000 to 1,000,000.

4,017,559

POLYBLEND CONTAINING TWO GRAFTED RUBBER COMPONENTS

Gary L. Deets, and Robert L. Kruse, both of Springfield, Mass., assignors to Monsanto Company, St. Louis, Mo.

Continuation-in-part of Ser. No. 291,949, Sept. 25, 1972, which is a continuation-in-part of Ser. No. 220,428, Jan. 24, 1972, abandoned. This application July 1, 1975, Ser. No. 592,282

Int. Cl.² C08L *55/02*, *57/08*

U.S. Cl. 260—876 R 8 Claims

1. A polyblend composition comprising:

A. a polymer of a monovinylidene aromatic monomer and an ethylenically unsaturated nitrile monomer wherein the weight ratio of monovinylidene aromatic monomer to nitrile monomer is in the range of 80/20 to 20/80;

B. from 16.5 to 80% by weight based on the total weight of the polyblend, of a grafted, crosslinked polychloroprene rubber having a Mooney viscosity of at least 200 (MS 2-½ min. 212° F.), said rubber being grafted with:

1. at least one monovinylidene aromatic monomer, and

2. an ethylenically unsaturated nitrile monomer; wherein the weight ratio of monovinylidene aromatic monomer to nitrile monomer in the grafted rubber is in the range of 80/20 to 20/80;

wherein the amount of polychloroprene rubber in the polyblend, calculated as ungrafted rubber, is in the range of from 15 to 40% by weight, based on the total weight of the polyblend and wherein the particle size of the polychloroprene rubber prior to grafting is in the range of from 0.05 to 0.20 micron;

C. from 0.5 to 5% by weight, based on the total weight of the polyblend, of a butadiene rubber having a particle size in the range of from 0.07 to 4.0 microns, said butadiene rubber having been grafted with:

1. at least one monovinylidene aromatic monomer, and

2. an ethylenically unsaturated nitrile monomer; wherein the weight ratio of monovinylidene aromatic monomer to nitrile monomer in the grafted rubber is in the range of 80/20 to 20/80; and

D. from 6 to 12% by weight, based on the total weight of the polyblend of Sb_2O_3.

4,017,560

AQUEOUS EMULSION LATEX DERIVED RUBBERY COPOLYMER

James J. Tazuma, Stow, and Mario D. Zadra, Barberton, both of Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio

Division of Ser. No. 510,332, Sept. 30, 1974, Pat. No. 3,929,737. This application Dec. 18, 1975, Ser. No. 641,848

Int. Cl.² C08F *2/24*, *255/08*, *285/00*

U.S. Cl. 260—888 9 Claims

1. An aqueous emulsion latex-derived rubbery copolymer prepared by the method which comprises free radical polymerizing 100 parts by weight of a mixture comprising about 60 to about 95 weight percent of a diene selected from 1,3-butadiene and isoprene and, correspondingly, about 40 to about 5 weight percent of a comonomer selected from styrene and acrylonitrile, in the presence of about 2 to about 6 weight percent of a soap which comprises about 50 to about 100 weight percent of the sodium or potassium salt of an anhydride-modified resin backbone and, correspondingly, about 50 to about 0 weight percent of a sodium or potassium salt of a rosin acid where said modified resin backbone is characterized by having a softening point in the range of about 45° to about 100° C. having a basic resin backbone of piperylene and methyl branched monoolefins which comprises about 50 to about 60 mole percent units derived from piperylene and about 20 to about 30 mole percent units derived from monoolefins selected from at least one methyl branched chain α or β monoolefin containing 4 to 6 carbon atoms, where the mole ratio of piperylene to said branched monoolefin is about 0.8/1 to about 2/1, in combination with about 10 to about 30 mole percent units derived from maleic anhydride, based on the total resin composition.

4,017,561

WET SPUN MODACRYLIC FILAMENTS WITH IMPROVED COLORISTIC PROPERTIES

Ralf Miessen, Dormagen; Günter Blankenstein, Stommeln; Siegfried Korte, Leverkusen, and Carlhans Süling, Odenthal-Hahnenberg, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Nov. 11, 1975, Ser. No. 630,776

Claims priority, application Germany, Nov. 15, 1974, 2454323

Int. Cl.² C08L *33/20*

U.S. Cl. 260—898 5 Claims

1. A wet-spun modacrylic filament with improved coloristic properties and adequate dimension stability under dyeing conditions based on a polymer mixture, which comprises at least one acrylonitrile-vinyl chloride copolymer and a chlorine-containing copolymer containing sulphonic acid groups or sulphuric acid ester groups.

4,017,562

PHOSPHONITRILATE POLYMERS AND METHOD OF PREPARATION

Charles R. Bergeron, Baton Rouge, La., assignor to Ethyl Corporation, Richmond, Va.

Continuation-in-part of Ser. No. 285,007, Aug. 30, 1972, Pat. No. 3,795,526. This application Dec. 14, 1973, Ser. No. 424,897

The portion of the term of this patent subsequent to Mar. 5, 1991, has been disclaimed.

Int. Cl.² C07F *9/24*

U.S. Cl. 260—927 N 6 Claims

1. A process for preparing a phosphonitrilate polymer having an average molecular weight of from about 800 to about 2000 comprising adding an alcohol and water to a slurry of an alkali metal in an inert solvent to form a mixture of an alkali metal alcoholate and an alkali metal hydroxide in said solvent and reacting said mixture at a temperature of from about 55° to about 110° C for a period of from about 0.5 to about 10

hours in a hot inert solvent with a cyclic oligomeric chlorophosphazene having the general formula

wherein *a* is at least 3, said mixture having from about 5 to about 15 weight percent excess of the theoretical amount of said alkali metal alcoholate and from about 0.1 to about 10 percent by weight of said alkali metal hydroxide based on said alcoholate.

6. A phosphonitrilate polymer produced by the process of claim 1.

4,017,563
O-ETHYL-S-N-BUTYL-O-(2- OR 3-NITROPHENYL) PHOSPHOROTHIOLATES

Alexis A. Oswald, Mountainside, and Paul L. Valint, Woodbridge, both of N.J., assignors to Ciba-Geigy AG, Basel, Switzerland

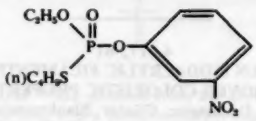
Filed Dec. 15, 1972, Ser. No. 315,389

Claims priority, application Switzerland, Dec. 16, 1971, 18439/71; Oct. 27, 1972, 15728/72

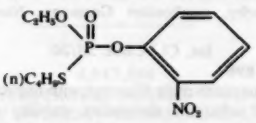
Int. Cl.² C07F *9/18*

U.S. Cl. 260—954 **2 Claims**

1. The compound of the formula



2. The compound of the formula



4,017,564
PROCESS FOR THE PRODUCTION OF (METH)ALLYL PHOSPHONIC ACID DIALKYL ESTERS

Günter Arend; Heinz Schaffner, and Jürgen Schramm, all of Dormagen, Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

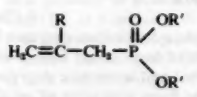
Filed Aug. 26, 1975, Ser. No. 607,946

Claims priority, application Germany, Sept. 5, 1974, 2442428

Int. Cl.² C07F *9/40*

U.S. Cl. 260—969 **8 Claims**

1. A process for the production methallyl phosphonic acid dialkyl esters of the formula



wherein

R represents hydrogen or methyl, and

R′ represents a straight-chain or branched, unsubstituted or halogen-substituted alkyl radical having up to 4 carbon atoms, which comprises reacting allyl chloride or methallyl chloride with a phosphorous acid trialkyl ester (trialkyl phosphites) of the formula:

$$P(OR')_3$$

in which R′ is as defined above, under atmospheric pressure at a temperature in the range of from 80° to 160° in the presence of from 0.5 to 7 mole % based on the phosphite of a catalyst selected from the group consisting of elemental nickel, Raney nickel, nickel tetracarbonyl, nickel triphenyl phosphine tricarbonyl, nickel-bis-(triphenyl phosphine)-dicarbonyl, π-allyl nickel chloride, π-allyl nickel bromide, π-allyl nickel iodide, π-cyclopentadienyl nickel nitrosyl, nickel diacrylonitrile, Raney cobalt, dicobalt octacarbonyl, cobalt-II-chloride and cobalt-II-bromide.

4,017,565
DEVICE FOR ADMIXING A GASEOUS AND A LIQUID PHASE

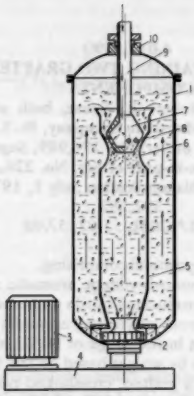
Hans Müller, Im Almendli, Erlenbach, Zurich, Switzerland

Continuation of Ser. No. 487,808, July 11, 1974, abandoned. This application Feb. 24, 1976, Ser. No. 661,026

Claims priority, application Switzerland, July 13, 1973, 10300/73

Int. Cl.² B01F *3/04*; C12B *1/16*

U.S. Cl. 261—36 R **7 Claims**



1. In a device for admixing a liquid and a gaseous medium, particularly in a reaction vessel or a fermentor, a combination comprising an upright vessel for the liquid medium; a substantially cylindrical tubular baffle extending in said vessel upwardly from a lower region thereof, said cylindrical tubular baffle having a lower open end and an upper end portion provided with a constricted region which bounds a throat; admitting means for admitting the gaseous medium into said cylindrical tubular baffle in the region of said throat, said admitting means including a substantially barrel-shaped elongated hollow gas-admitting body located in said upper end portion of said cylindrical tubular baffle coaxially with said throat, and defining a substantially Venturi-shaped annular gap in said throat with said constricted region, said hollow gas-admitting body having an interior containing a replenishable volume of the gaseous medium and a plurality of small-sized gas outlet openings penetrating said hollow gas-admitting body in a common plane which extends normal to the longitudinal axis of said hollow gas-admitting body, said openings being directed outwardly of said hollow gas-admitting body so as to communicate said interior of the latter with said Venturi-shaped annular gap to thereby supply the gaseous

medium into said Venturi-shaped annular gap in direction toward said constricted region of said cylindrical tubular baffle; and impeller means located in the region of said lower open end of said cylindrical tubular baffle and operative for drawing the liquid medium downwardly through said cylindrical tubular baffle and through said annular gap so that underpressure caused by Venturi effect develops in the liquid medium flowing through said Venturi-shaped annular gap and draws the gaseous medium in form of a fine dispersion through said plurality of small-sized gas outlet openings into said Venturi-shaped annular gap.

4,017,566
VAPORIZER FOR ANAESTHETICS

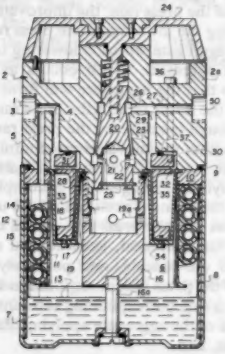
Peter Seidel, Lubeck, Germany, assignor to Dragerwerk Aktiengesellschaft, Germany

Filed Feb. 11, 1976, Ser. No. 657,219

Claims priority, application Germany, Feb. 20, 1975, 2507281

Int. Cl.² A61M *15/00*

U.S. Cl. 261—56 **7 Claims**



1. A vaporizer for anaesthetics or narcotics comprising a housing having an interior liquid narcotic reservoir and an evaporation chamber above said reservoir, an inlet into said housing, an outlet passage in said housing spaced from said inlet, a first conduit for evaporation gases extending from said inlet to said evaporation chamber and from said evaporation chamber to said outlet passage, a second bypass conduit extending from said inlet to said outlet passage and having an annular portion, flow control means in said second bypass passage comprising an annular trough-shape member having a bottom wall closing one end of said annular portion, a hollow cylindrical member positioned in said trough-shape member and having a top planar wall, a ring-shape member having a bottom planar wall opposed to said top planar wall of said hollow cylindrical member, and sealing means including an anchor for suspending said annular ring member in said housing and being of a different thermal coefficient of expansion than said housing to permit relative movement of said ring member to vary the gap between said flat bottom surface of said ring member and said planar surface of said hollow cylinder member.

4,017,567
PROCESS FOR THE PRODUCTION OF BLOCK FUEL ELEMENTS FOR GAS COOLED HIGH TEMPERATURE POWER REACTOR

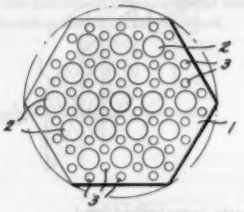
Milan Hrovat, Rodenbach; Willi Wolff, Kahl, and Karl-Gerhard Hackstein, Hanau, all of Germany, assignors to Nukem G.m.b.H., Hanau, Germany

Continuation of Ser. No. 218,244, Jan. 17, 1972, abandoned. This application May 13, 1975, Ser. No. 577,054

Claims priority, application Germany, Jan. 30, 1971, 2104431

Int. Cl.² G21C *21/00*

U.S. Cl. 264—.5 **11 Claims**



1. In a process for the production of molded block fuel elements having an isotropic structure and useful in gas cooled high temperature power reactors, said fuel elements comprising fuel-containing and fuel-free zones and a graphite matrix in both the fuel-containing and fuel-free zones including the steps of making a fuel-free block-shaped graphite matrix zone by first molding a graphite and binder containing molding composition, making fuel channels and cooling channels in the graphite matrix, encasing coated fuel particles with a binder containing graphite powder and making prepressed fuel rods by molding said encased coated fuel particles, placing said fuel rods into said fuel channels finally, molding the composite body thus formed and carbonizing said composite body the improvement comprising first producing isotropic graphite granulates of density 1.5 to 1.9 g/cm³ with a porosity of 7.5 to 25 percent by volume and wherein said granulates have an average particle diameter of about 1 mm and each granulate particle contains several hundred thousand isotropically arranged graphite particles by molding in a first molding step from a molding powder having an average grain diameter of about 20 microns and then preliminarily hot molding these isotropic granulates to form said block-shaped fuel-free matrix zone, and afterwards in the final molding step hot molding the composite bodies each consisting of a fuel-free matrix zone with inserted fuel rods at a pressure lower than that applied in said first molding step to form said isotropic fuel elements, the molding powder consisting essentially of a mixture of (A) a binder resin with (B) a member of the group consisting of (1) natural graphite grains, and (2) synthetic graphite grains, and (3) a mixture of both natural and synthetic graphite grains.

4,017,568
TECHNIQUE FOR COMPRESSION SEALING ELECTRICAL CONDUCTORS IN A RIGHT CIRCULAR CYLINDER RESIN CASTING

James F. Quirk, Pittsburgh, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed May 20, 1974, Ser. No. 471,738

Int. Cl.² B29D *3/00*; B29G *7/00*; H01B *17/26*

U.S. Cl. 264—27 **2 Claims**

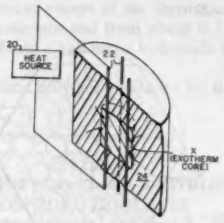
1. A method for consistently producing a gas-tight compression seal between the resin composition of a right circular cylinder resin casting and one or more electrical conductors extending through the end walls of the right circular cylinder resin casting without the use of bonding agents, comprising the steps of,

positioning one or more electrical conductors within a mold designed to form a right circular cylinder resin casting

having a surface-to-volume ratio in a range between approximately 0.9 inches^{-1} and 2.0 inches^{-1},

locating the said one or more electrical conductors within a volume of said mold corresponding to the exotherm core of a resin composition to be introduced into said mold,

casting a resin composition of a type to develop an exotherm core of approximately 150° C in said mold and produce a right circular cylinder resin casting having a surface-to-volume ratio in a range of between approximately 0.9 inches^{-1} and 2.0 inches^{-1},



curing said resin composition, and

heating said one or more electrical conductors, as required, to a temperature approximating the temperature of said exotherm core of said resin composition to assure the collapse of the resin composition of said exotherm core about said one or more electrical conductors during curing to produce a compression seal between said resin composition and said one or more electrical conductors.

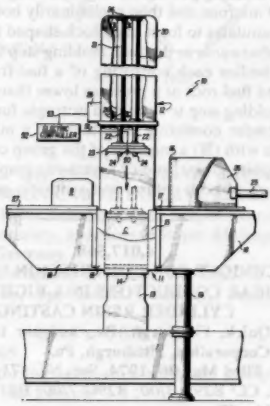
4,017,569
ANODE VIBRATOR AND PRESS

Wynn M. Hass, Owensboro, Ky., assignor to Southwire Company, Carrollton, Ga. and National Steel Corporation, Pittsburgh, Pa.

Division of Ser. No. 419,862, Nov. 28, 1973, Pat. No. 3,883,278, which is a continuation-in-part of Ser. No. 163,766, July 19, 1971, abandoned. This application May 12, 1975, Ser. No. 576,857

Int. Cl.² G05D *15/00, 15/01*

U.S. Cl. 264—40.2 **8 Claims**



1. In a method of forming a carbon anode block, having indentations in the upper surface thereof, comprising the steps of:

a. discharging carbon aggregate into a vertically movable mold;

b. vibrating the aggregate in the mold to expel substantially all air therefrom and cause compaction thereof, the upper surface of the aggregate thereby moving downwardly; and

c. compressing the aggregate by lowering a press ram thereagainst to further compact its particles and to form indentations in the aggregate conforming to protrusions on the lower face of the press ram; the improvement comprising;

d. synchronizing the lowering of the press ram during vibration of the aggregate with the lowering of the upper surface of the aggregate which occurs as a result of the vibration so that the aggregate will form around the protrusions on the lower face of the press ram, and maintaining only enough pressure by the press ram to contain the aggregate within the movable mold until substantially all air has been expelled from the aggregate,

wherein said synchronizing step is accomplished by sensing changes in the relative positions of the upper surfaces of the aggregate and the press ram, which changes occur as a result of the vibration, generating a control signal in response to the sensing, and positively controlling the lowering of the press ram in response to said signal so that it moves at a rate corresponding substantially to the compaction rate of the aggregate applying little or no pressure thereagainst, and

wherein said sensing step is performed by passing an electrical current through the aggregate.

5. In a method of forming a carbon anode block, having indentations in the upper surface thereof, comprising the steps of:

a. discharging carbon aggregate into a vertically movable mold;

b. vibrating the aggregate in the mold to expel substantially all air therefrom and cause compaction thereof, the upper surface of the aggregate thereby moving downwardly; and

c. compressing the aggregate by lowering a press ram thereagainst to further compact its particles and to form indentations in the aggregate conforming to protrusions on the lower face of the press ram; the improvement comprising:

d. synchronizing the lowering of the press ram during vibration of the aggregate with the lowering of the upper surface of the aggregate which occurs as a result of the vibration so that the aggregate will form around the protrusions on the lower face of the press ram, and maintaining only enough pressure by the press ram to contain the aggregate within the movable mold until substantially all air has been expelled from the aggregate,

wherein said synchronizing step is accomplished by sensing changes in the relative positions of the upper surfaces of the aggregate and the press ram, which changes occur as a result of the vibration, generating a control signal in response to the sensing, and positively controlling the lowering of the press ram in response to said signal so that it moves at a rate corresponding substantially to the compaction rate of the aggregate applying little or no pressure thereagainst, and

wherein said sensing step is performed by providing a reference threshold pressure, monitoring the pressure applied by the press ram against the aggregate, and generating said control signal only upon the appearance of an applied pressure which exceeds the threshold pressure.

4,017,570
METHOD OF PRODUCING THREE DIMENSIONAL SKELETAL STRUCTURES

Warren A. Rice, Dexter; Clarence S. Vinton, Ann Arbor, and Hugh Richard Norris, Fowlerville, all of Mich., assignors to Chemotronics International, Inc., Ann Arbor, Mich.

Continuation of Ser. No. 131,224, April 5, 1971, abandoned. This application Apr. 2, 1973, Ser. No. 346,998

Int. Cl.² B29D *27/00;* **B22F** *3/02, 3/10*

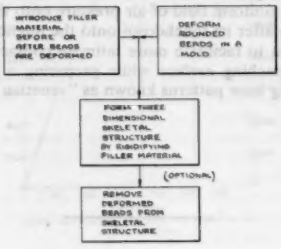
U.S. Cl. 264—42 **10 Claims**

1. In the method of producing a three dimensional skeletal structure by introducing and rigidifying a powdered filler material which is to form the skeletal structure in a matrix formed by a removable mold of packed beads which can be removed by melting, decomposition or volatilization or by a

solvent or reactant which is a non-solvent or non-reactant with the filler material, the improvement which comprises:

a. partially deforming packed deformable beads having comparable dimensions and an average diameter of at least about one one-hundredth of an inch which are in contact with each other to form a mold with interconnected void spaces between the partially deformed beads;

b. introducing particles of a powdered filler material which is loosely bondable upon compression into the interconnected void spaces between the packed, partially deformed beads while maintaining the beads in contact with each other;


INTRODUCE FILLER MATERIAL BEFORE OR AFTER BEADS ARE DEFORMED
DEFORM ROUNDED BEADS IN A MOLD
FORM THREE DIMENSIONAL SKELETAL STRUCTURE BY RIGIDIFYING FILLER MATERIAL
(OPTIONAL)
REMOVE DEFORMED BEADS FROM SKELETAL STRUCTURE

c. compressing the powdered filler material and the partially deformed beads to form a heterogeneous solid mass of fully deformed beads with the particles of the filler material bonded together to form the continuous and interconnected skeletal structure without being bonded to the beads sufficiently to prevent removal and wherein the fully deformed beads occupy between about 80 and 98 percent of the total volume; and

d. removing the deformed beads from the heterogeneous mass without removing the filler material forming the skeletal structure.

4,017,571

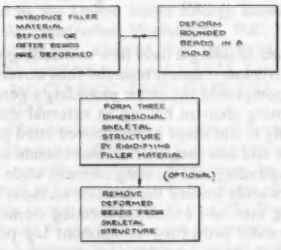
METHOD OF PRODUCING THREE DIMENSIONAL SKELETAL STRUCTURES

Warren A. Rice, Dexter; Clarence S. Vinton, Ann Arbor, and Hugh Richard Norris, Fowlerville, all of Mich., assignors to Chemotronics International, Inc., Ann Arbor, Mich.

Continuation of Ser. No. 131,224, April 5, 1971, abandoned. This application Apr. 2, 1973, Ser. No. 346,999

Int. Cl.² B29D *27/00;* **B22F** *3/02, 3/10*

U.S. Cl. 264—42 **12 Claims**


INTRODUCE FILLER MATERIAL BEFORE OR AFTER BEADS ARE DEFORMED
DEFORM ROUNDED BEADS IN A MOLD
FORM THREE DIMENSIONAL SKELETAL STRUCTURE BY RIGIDIFYING FILLER MATERIAL
(OPTIONAL)
REMOVE DEFORMED BEADS FROM SKELETAL STRUCTURE

1. In the method of producing a three dimensional skeletal structure by introducing and rigidifying a liquid hardenable filler material which is to form the skeletal structure in a matrix formed by a mold of packed beads which can be removed from the filler material by melting, decomposition or volatization or by a solvent or reactant which is a non-solvent or non-reactant with the filler material, the improvement which comprises:

a. deforming packed beads having comparable dimensions and an average diameter of at least about 1/100th inch which are in contact with each other and which are rounded such that a mold is formed with a matrix of interconnected spaces between the deformed beads defining a three dimensional skeletal structure of continuous interconnected strands which contains the liquid filler material completely filling the matrix of interconnected spaces between the deformed beads;

b. rigidifying the liquid hardenable filler material to form a continuous and interconnected skeletal structure having openings between the strands and wherein the deformed beads define between about 80 and 98 percent of the total volume; and

c. removing the deformed beads without removing the filler material forming the skeletal structure.

4,017,572

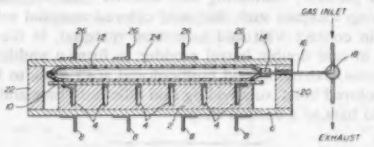
METHOD OF MOLDING ARTICLES OF POLYMERIC FOAM SUBSTANTIALLY FREE FROM FLASHING

Raymond L. Magone, Redondo Beach, Calif., and Samir N. Saaty, Orange, Conn., assignors to The Upjohn Company, Kalamazoo, Mich.

Division of Ser. No. 439,573, Feb. 4, 1974, abandoned. This application Apr. 15, 1975, Ser. No. 568,256

Int. Cl.² B29D *27/04*

U.S. Cl. 264—51 **6 Claims**



1. A process for molding an article of polymer foam substantially free from flashing using a polymer foam forming mix comprising ingredients which undergo chemical interaction with simultaneous blowing in situ, said process being characterized by the steps of:

providing a two piece mold, one of said mold pieces being substantially rigid and the other of said mold pieces being relatively flexible;

providing a jig comprising two facing jig members held in permanent, spaced apart, relationship one of said jig members having disposed thereon an inflatable hollow flexible bag;

providing an opening in said jig to permit insertion of said assembled two piece mold between said facing jig members without disassembly, in whole or in part, of said jig;

charging polymer foam forming mix to the cavity of said two piece mold;

inserting said charged mold, after assembly thereof, between the said two facing jig members via said opening in said jig;

inflating said hollow flexible bag to a pressure such that the two mold pieces are held in sealing engagement one with the other and said mold is held in clamped engagement with said jig solely by means of said inflated bag;

permitting said foam mix to expand and set in said mold so disposed in said jig;

thereafter deflating said flexible bag and removing said mold and contents from said jig via said opening without disassembly of said jig in whole or in part, and

demolding said article of polymer foam.

4,017,573

PROCESS FOR MAKING VARIEGATED SOAP

Hargovind Himatlal Joshi, Piscataway, N.J., assignor to Colgate-Palmolive Company, New York, N.Y.

Filed June 4, 1975, Ser. No. 583,802
Int. Cl.² B29F 3/12; C11D 13/08, 13/18
U.S. Cl. 264—75 6 Claims

1. A method for producing multicolored soap bars comprising the steps of supplying to the vacuum chamber of a double barrel plodder which comprises upper and lower barrels separated by a vacuum chamber, a colored material including a liquid oil vehicle selected from oils of animal, vegetable and mineral origin and a water soluble dye, supplying a base soap material to said plodder, combining said colored material with said base soap material in the lower barrel of said double barrel plodder to form a multicolored soap mass, extruding said multicolored soap mass to form a multicolored billet, subdividing said billet into bars and pressing said bars to a desired shape.

4,017,574

PROCESS FOR MAKING VARIEGATED SOAP

Hargovind Himatlal Joshi, Piscataway, N.J., assignor to Colgate-Palmolive Company, New York, N.Y.

Filed June 4, 1975, Ser. No. 583,801
Int. Cl.² B29F 3/12; C11D 13/08, 13/18
U.S. Cl. 264—75 7 Claims

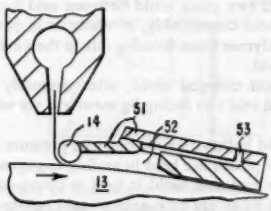
1. A method for producing multicolored soap bars comprising the steps of, supplying to the vacuum chamber of a double barrel plodder which comprises upper and lower barrels separated by a vacuum chamber, a liquid colored material including a meltable solid vehicle in a melted state selected from wax and wax-like materials having a melting point above about 100° F and a water soluble dye, supplying a base soap material to said plodder, combining said colored material with said base soap material such that said colored material solidifies when in contact with said base soap material, in the lower barrel of said double barrel plodder to form a multicolored soap mass, extruding said multicolored soap mass to form a multicolored billet, subdividing said billet into bars and pressing said bars to a desired shape.

4,017,575

PRODUCTION OF A FLAT THERMOPLASTIC FILM BY PASSING THE FILM OVER A BEARING HAVING A LUBRICATING FLUID ON THE SURFACE THEREOF

David E. Heyer, Circleville, Ohio, assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation of Ser. No. 232,764, March 8, 1972, abandoned, which is a continuation-in-part of Ser. No. 23,390, March 27, 1970, abandoned. This application Aug. 16, 1973, Ser. No. 388,835
Int. Cl.² B29D 7/02
U.S. Cl. 264—89 1 Claim



1. In the process for the preparation of flat thermoplastic film in which a molten web is cast in a catenary path from an extrusion die onto a moving quenching surface, the improvement which comprises:

passing the freshly extruded molten web as it moves in a free melt span over a bearing positioned between the orifice of the extrusion die and the normal touchdown point of the web onto the quenching surface;

providing a layer of fluid on the surface of the bearing;

displacing the molten web from its catenary path to an earlier tangential approach path from the extrusion die to the quenching surface by means of the layer of fluid on the surface of the bearing;

maintaining the fluid at a distributed pressure equal to the pressure exerted toward the bearing surface as a result of the tension of the web and sufficient to maintain the freshly extruded web out of contact with the surface of the bearing; and

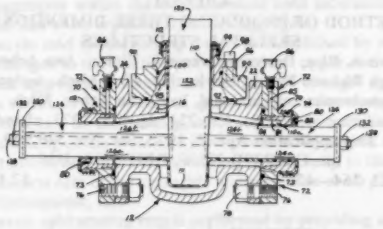
applying a uniform field of air pressure onto the surface of the web after its touchdown onto the quenching surface sufficient to facilitate more intimate contact of the web and quenching surface while preparing a film free of recurring haze patterns known as "venetian blind haze."

4,017,576

METHOD OF LINING A PLUG VALVE

Jacob B. Freed, Battle Creek, Mich., and Victor G. Reiling, Dayton, Ohio, assignors to Union Pump Company, Battle Creek, Mich.

Continuation of Ser. No. 273,193, July 19, 1972, abandoned, which is a division of Ser. No. 35,016, May 6, 1970, Pat. No. 3,698,422. This application May 28, 1974, Ser. No. 473,379
Int. Cl.² B29D 23/01; B27J 5/00
U.S. Cl. 264—91 16 Claims



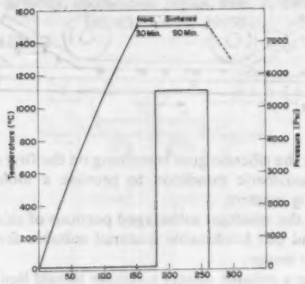
4. A method of lining a fluid flow-controlling member with a layer of corrosion-resistant material fully covering the interior thereof, comprising the steps: providing a generally hollow resilient forming element having an external shape generally corresponding to the shape of the desired lined passage within said member and inserting said element inside such member; resiliently expanding said forming element while inside of said member outwardly toward the interior surfaces of said member; inserting into said expanded forming element a mandrel having outwardly projecting component leg portions which are disposed at relative angles with respect to one another; resiliently contracting said forming element about said mandrel to provide a clearance space between the contacted forming element there upon and the internal walls of said member; loading a quantity of said corrosion-resistant lining material into said clearance space; resiliently expanding said forming member away from said mandrel to at least slightly compress said material, removing the mandrel from said forming element, and removing said forming element from said member.

4,017,577

HOT PRESSING OF REACTION SINTERED CaB_6

Sunil K. Dutta, West Newton, Mass., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Feb. 15, 1974, Ser. No. 443,069
Int. Cl.² C04B *35/58*
U.S. Cl. 264—102 **1 Claim**



TYPICAL HOT-PRESSING SCHEDULE FOR REACTION HOT PRESSED CaB_6

1. A method for the production of high density compact of calcium hexaboride comprising the steps of:

after preliminary evacuation, gradually heating stoichiometric quantities of calcium oxide having an average particle size of 2.2 microns and boron powder having a particle size of less than 1 micron at a rate of approximately 8°–10° C per minute to a temperature of approximately 1,500° C.

maintaining the calcium oxide and boron powder at the above temperature for approximately 30 minutes to cause their reaction to produce calcium hexaboride;

applying a pressure of approximately 5,500 pounds per square inch to the produced calcium hexaboride;

maintaining the produced calcium hexaboride at 1,500° C and 5,500 psi for approximately 90 minutes to produce a sintered compact and

returning the pressure to atmospheric conditions while allowing the sintered compact to gradually cool to ambient temperatures.

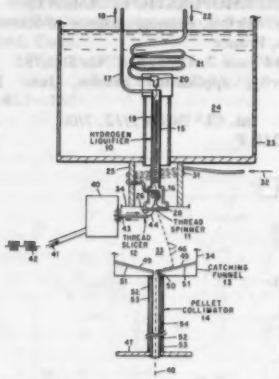
4,017,578

METHOD FOR PRODUCING LASER TARGETS

Thomas R. Jarboe, Oakland, and William R. Baker, Orinda, both of Calif., assignors to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Division of Ser. No. 446,066, Feb. 26, 1974, Pat. No. 3,907,477. This application June 12, 1975, Ser. No. 586,459
Int. Cl.² B02C *18/02*; G21B *1/02*
U.S. Cl. 264—143 **1 Claim**

1. A method for producing laser targets of deuterium having a diameter in the range of 25μ to 75μ comprising the steps of precooling a quantity of liquid deuterium, by cooling the liquid deuterium to a temperature in the range of 19° K to 22° K at a pressure in the range of 400 to 1200 Torr, forming a continuous thread of the thus cooled deuterium, by directing the thus cooled deuterium through a tapered orifice at a rate of about 50 micron-liters per second into a vacuum chamber maintained at less than 10^{-4} torr slicing the thus formed thread into desired length pellets, by use of a wire held at about 21° K collecting the thus sliced pellets, in a funnel bearing a roughened surface with a slope of about 20° and held at a temperature of about 77° K and collimating the collected pellets for passage thereof through the focal point of a laser system by passing the thus collected pellets through a capillary tube held at liquid nitrogen temperature and bearing a clean, smooth interior wall wherein the pressure within said tube continuously decreases from said funnel to said focal



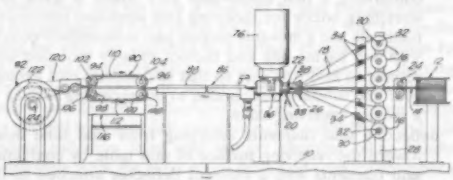
point of said system and is sufficiently low so as to prevent the pellets from becoming unduly warmed.

4,017,579

METHOD FOR FORMING A SHEATHED ELECTRICAL CABLE

Norman P. Roe, and Gordon W. Brown, both of Idyllwild, Calif., assignors to Consolidated Products Corporation, Idyllwild, Calif.

Filed Nov. 18, 1974, Ser. No. 524,643
Int. Cl.² B29F *3/10*; H01B *7/18*
U.S. Cl. 264—174 **7 Claims**



1. A method of manufacturing a sheathed electromechanical cable for submarine use which includes the steps of:

feeding along a predetermined path an electrically conducting cable core covered by a hardened plastic insulating material and having a circular cross-section,

feeding a plurality of annularly disposed discrete flexible strain members along a converging course directed toward said predetermined path of said core,

drawing said strain members into close contact with said cable core with the individual members extending parallel to one another and to the longitudinal axis of said cable core and disposed about the core with a circumferential spacing,

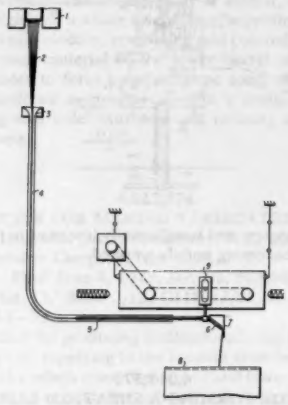
simultaneously advancing said cable core and strain members along said predetermined path, and

continuously lengthwise extruding a molten thermoplastic material about the cable core and strain members as they simultaneously advance along said predetermined path to thereby provide a tubular sheath whose inner surface is brought into close contact with the outer surfaces of the strain members but is not forced to fill the circumferential spaces between the strain members, thereby providing a cable in which the strain members are free to physically reorient themselves helically about the axis of the cable when the latter is twisted.

4,017,580
PROCESS AND APPARATUS FOR MANUFACTURING NON-WOVEN WEBS OF CONTINUOUS THERMOPLASTIC FILAMENTS

Jacques Barbey, Miribel, France, assignor to Rhone-Poulenc-Textile, Paris, France

Filed June 2, 1975, Ser. No. 582,755
Claims priority, application France, June 10, 1974, 74.20254
Int. Cl.² D01D *5/12, 7/00*
U.S. Cl. 264—210 F 10 Claims



1. In a process for manufacturing non-woven webs from continuous filaments by steps including extruding, stretching, deflecting and depositing a bundle of filaments on a receiving table, the improvement comprising,

passing the stretched continuous filaments through a tube for guiding continuous filamentary material, said tube comprising a first immovable part which is fixed to a stretching nozzle for receiving said stretched continuous filaments and a movable second part substantially coaxial with and having one end thereof slidably mounted with respect to said first part so that said second part extends over and substantially parallel to the receiving surface of a moving receiving table,

deflecting said filaments emerging from said tube down toward the receiving surface of said table by contacting said filaments with a filament deflector attached to the other end of the second part of said guiding tube,

and distributing said deflected filaments in a non-woven web on the receiving surface of said moving receiving table by reciprocally moving said second part of the guiding tube in a plane which is transverse to the direction in which the receiving surface of said receiving table is simultaneously moving.

4,017,581
PROCESS FOR PREPARING RELIEF PRINTING MASTERS AND MOLDS

Alan B. Amidon, Penfield, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Mar. 25, 1975, Ser. No. 561,824
Int. Cl.² B29C *1/02;* B32B *31/18*
U.S. Cl. 264—220 10 Claims

5. A method for preparing a printing master comprising:

a. providing a suitable first substrate,

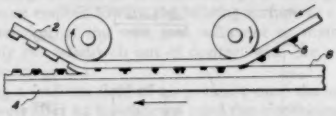
b. depositing a particulate material in image configuration on said first substrate,

c. providing a second substrate,

d. coating said second substrate with a tacky adhesive silicone gum curable to an adhesive elastomeric condition,

e. contacting said coated substrates such that the adhesive is in contact with the image bearing substrate in the nonimaged areas and is in contact with the particulate material in the imaged areas,

f. separating said substrates whereby the silicone splits in the nonimaged areas and is prevented from splitting by the transfer of the particulate image material in the imaged areas, and whereby the image material is transferred from the first substrate to the second substrate,



g. curing the silicone gum remaining on the first substrate to an elastomeric condition to provide a mold for relief printing masters,

h. filling the resultant submerged portions of said mold with a liquid but hardenable material suitable for forming a master image,

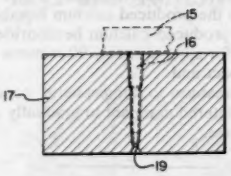
i. affixing a suitable master substrate to said liquid material,

j. hardening the liquid material and removing the resultant replica from the mold.

4,017,582
PROCESS FOR MAKING A PROBE SHEET

John R. Naumann, 347 N. 5th East, Brigham City, Utah 84302

Division of Ser. No. 322,966, Jan. 12, 1973, Pat. No. 3,880,282. This application Mar. 12, 1975, Ser. No. 557,785
Int. Cl.² B29D *23/02*
U.S. Cl. 264—291 1 Claim



1. A method of manufacturing a disposable sheath for a temperature sensing probe comprising the steps of

producing a tapered mandrel having the interior shape of the sheath to be produced;

positioning said mandrel to be in a cavity shaped to conform to the outer shape of the sheath to be produced such that said mandrel is spaced a distance from the cavity wall corresponding to the desired wall thickness of the sheath, the distance between the tapered mandrel and the cavity wall adjacent to the small end of the mandrel is not larger than about 0.012 inch, the distance at the large end of the mandrel is at least about 0.039 inch and the distance at the small tip end of the mandrel is less than about 0.002 inch;

injecting a suitable plastic selected from the group consisting of styrene, polypropylene and polyethylene into the space between the cavity and the mandrel at the tip end of the sheath through an orifice having a diameter of from 0.007 inch to 0.021 inch;

cutting off flow through the orifice; and

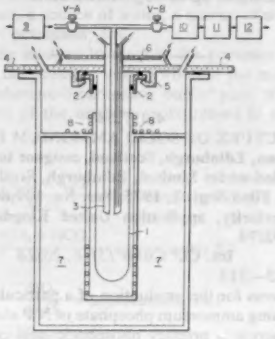
withdrawing the mandrel from the orifice while the plastic is in a moldable condition whereby the wall thickness adjacent a closed tip of the sheath is drawn down and the tip is fully enclosed said wall thickness at the top being such that rapid heat transfer will be obtained therethrough.

4,017,583

VOLITILIZATION PROCESS FOR SEPARATION OF MOLYBDENUM-99 FROM IRRADIATED URANIUM

Kenji Motojima, Mito; Matae Iwasaki, Ibaragi; Kazuya Suzuki, Ibaragi; Yoshihide Komaki, Ibaragi, and Katsuaki Ichiyanagi, Tokyo, all of Japan, assignors to Japan Atomic Energy Research Institute, Tokyo, Japan

Filed Jan. 31, 1975, Ser. No. 546,120
Claims priority, application Japan, Feb. 7, 1974, 49-14930
Int. Cl.² C01G *39/00*
U.S. Cl. 423—2 7 Claims



1. A process for separating and collecting molybdenum-99 in the form of molybdenum trioxide from neutron-irradiated, uranium, comprising:

heating the neutron-irradiated uranium in an atmosphere of oxygen under sub-atmospheric pressure to a temperature sufficient to oxidize the uranium to powdered triuranium octoxide,

heating the formed triuranium octoxide in vacuo to a temperature sufficient to sublimate molybdenum-99 in the form of molybdenum trioxide, and

condensing the sublimated molybdenum-99 in the form of molybdenum trioxide on a collector.

4,017,584

PROCESS FOR THE RECOVERY OF ALUMINUM TRICHLORIDE

Giuseppe Messina, Alghero (Sassari), Italy; George Andrew Olah, Shaker Heights, Ohio, and Riccardo Moraglia, Sassari, Italy, assignors to Societa Italiana Resine S.I.R., S.p.A., Milan, Italy

Filed May 6, 1975, Ser. No. 574,953
Int. Cl.² C01F *7/56*; C01B *1/02, 1/16*
U.S. Cl. 423—122 8 Claims

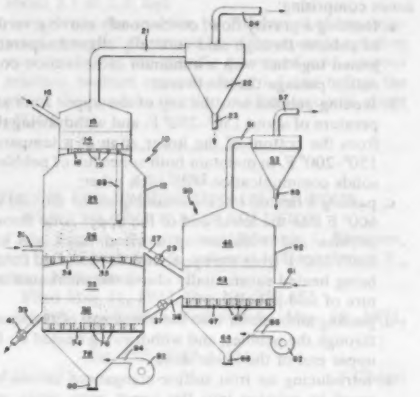
1. A method for separating and recovering aluminum trichloride from a complex of aluminum trichloride, hydrocarbons and hydrogen chloride, said complex containing at least 20% by weight aluminum trichloride, which comprises contacting said complex with particulate metallic aluminum surface activated by contact with hydrogen chloride at a temperature of from ambient temperature to 100° C, for at least 0.5 hours and, optionally employing agitation, thus causing the formation of a precipitate of aluminum trichloride and by-products including gaseous hydrogen and liquid hydrocarbon, and recovering the precipitated aluminum trichloride.

4,017,585

FLUID BED CALCINATION PROCESS

Peter A. Angevine, Ridgefield, and David W. Leyshon, Westport, both of Conn., assignors to Dorr-Oliver Incorporated, Stamford, Conn.

Filed Oct. 29, 1974, Ser. No. 518,800
Int. Cl.² C01B *25/16*
U.S. Cl. 423—167 2 Claims



1. A process for calcining phosphate rock containing contaminating quantities of the heavy metal cadmium comprising, preheating the phosphate rock in a primary chamber wherein the rock is fluidized by a first gas stream at a temperature of from about 700° C to about 800° C, the exhaust gas from said primary chamber being conducted to the stack, transferring the rock to a secondary chamber countercurrent to said first gas stream wherein fuel is injected into said chamber for combustion and the rock is fluidized by said first gas stream at a temperature of from about 450° C to about 500° C, transferring the rock for calcining to a tertiary chamber wherein fuel is injected for combustion to attain a temperature in the range from about 1000° C to about 1150° C to volatilize the cadmium and the rock is fluidized by a second gas stream flowing in parallel with said first gas stream, the exhaust gas and volatilized cadmium from said tertiary chamber being handled separately from the exhaust gas from said primary chamber so that the cadmium may be condensed therefrom for separate disposal, transferring the calcined rock to a cooling chamber for fluidization in said first gas stream, said calcined rock being cooled to a temperature of from about 450° C to about 500° C and the fluidizing gas being heated by said rock to this temperature range, discharging the cooled calcined rock from said cooling chamber and conducting the heated fluidizing gas to the secondary chamber as the fluidizing gas therefor.

2. A process for calcining cadmium-contaminated phosphate rock which is to be employed in the manufacture of phosphoric acid, the phosphate rock also containing significant quantities of the impurities carbon and sulfur, the calcination process to be connected in such a way as to avoid increasing the corrosive nature of the product phosphoric acid and removing the undesirable cadmium from the phosphate rock product, comprising, calcining the phosphate rock in a fluidized bed reactor at a temperature of from about 1000° C to about 1150° C while employing a detention time in the calcining fluidized bed of from 30 to 200 minutes to volatize the cadmium and so remove it from the phosphate rock as a vapor for disposal, maintaining oxidizing conditions in said reactor by controlling the exhaust gas from said reactor to contain at least about 0.5%, by volume, of oxygen so that the carbon and sulfur impurities are essentially completely oxidized and the formation of corrosive sulfide constituents is thereby prevented.

4,017,586
STACK GAS TREATMENT

Adam A. Reeves, P.O. Box 781, Rifle, Colo. 81650

Filed Aug. 6, 1975, Ser. No. 602,291
Int. Cl.² C01B *17/00, 17/72*
U.S. Cl. 423—242 2 Claims

1. A process for the reduction of sulfur dioxide in stack gas and for heating a stream of air in a vertically mounted two compartment reactor providing two vertically positioned zones comprising:

a. forming a gravity flow, continuously moving vertical bed of pebbles through said vertically aligned separate zones joined together with a minimum cross-section communication passage therebetween;

b. feeding pebbles into the top of the upper zone at a temperature of about 150°–250° F. and withdrawing the same from the bottom of the lower zone at a temperature of 150°–200° F. to maintain both zones full of pebbles and in solids communication with each other;

c. passing a heated stack containing sulfur dioxide at about 600° F into the lower end of the upper zone through said pebbles and withdrawing a clean stack gas at about 200°–250° F from the upper end thereof, said fluid stream being heated substantially above the maximum temperature of said pebbles;

d. passing ambient air into the lower end of the lower zone, through the pebbles, and withdrawing heated air from the upper end of the lower zone;

e. introducing an iron sulfate-manganese sulfate catalytic agent in solution into the upper zone along with said pebbles to wet the pebbles and to react oxygen of the air with sulfur compositions in the heated fluid stream;

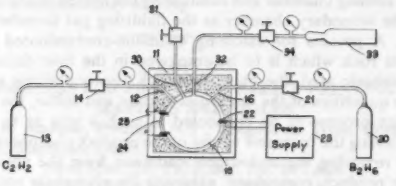
f. regulating the pebble withdrawal rate from said lower zone in accordance with the temperature of the withdrawn stack gas so as to maintain the pebbles moist in the upper portion of the upper chamber so as to permit oxidation of the sulfur dioxide in the stack gas; and

g. subjecting withdrawn spent fluid to a collector for resultant sulfuric acid to produce a cooled relatively sulfur-free gaseous fluid system.

4,017,587
BORON CARBIDE

Jerome F. Ditter, Covina; Francis J. Gerhart, Temple City, and Robert E. Williams, La Canada, all of Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Continuation of Ser. No. 864,957, Oct. 3, 1969, abandoned, which is a continuation of Ser. No. 695,315, Dec. 27, 1967, abandoned. This application Apr. 26, 1971, Ser. No. 137,626
Int. Cl.² C01B *31/36*
U.S. Cl. 423—291 5 Claims



1. A process of producing a boron carbide powder comprising the steps of:

providing a gaseous mixture of diborane and acetylene at a temperature less than 80° C to inhibit undesired side reactions and decomposition of the gases;

igniting the relatively low temperature gaseous mixture for producing a flame front;

promoting a relative movement between said flame front and said gaseous mixture for consuming the mixture in a flame reaction whereby said boron carbide powder is produced; and

recovering a reaction product of boron carbide powder.

5. A boron carbide powder of a porous nature with a surface area in excess of 100 m^2 per gram and with a mean pore size of about 30 Angstrom units and a mean particle diameter of less than one micron,

said powder being produced by a gaseous phase reaction of a boron hydride and acetylene and being amorphous to the extent that it has no apparent crystalline properties under X-ray spectroscopy and electron microscopy at magnifications up to 10,000 diameters.

4,017,588
MANUFACTURE OF SOLID AMMONIUM PHOSPHATE

Eric Davidson, Edinburgh, Scotland, assignor to Scottish Agricultural Industries Limited, Edinburgh, Scotland

Filed Sept. 2, 1975, Ser. No. 609,808
Claims priority, application United Kingdom, Sept. 13, 1974, 40002/74
Int. Cl.² C01B *15/16, 25/28*
U.S. Cl. 423—313 9 Claims

1. A process for the production of a particulate solid product comprising ammonium phosphate of N:P atomic ratio 0.95 to 1.05 wherein a primary phosphoric acid-containing feed and ammonia are added to an aqueous slurry of ammonium phosphate of flowable consistency at the temperature of working and having an N:P atomic ratio of between 1.3 and 1.5 to form more slurry of substantially the same composition and concentration and flowable consistency, removing an amount of said slurry substantially equivalent to that produced by the addition of the phosphoric acid and ammonia and thereafter mixing the removed slurry with a secondary acid feed to reduce the N:P ratio to 0.95 to 1.05, wherein between 20% and 80% by volume of the removed slurry is mixed with the secondary acid feed, followed by the addition to the mixture of the remainder of the slurry, so that the ammonium phosphate of the resulting product has an N:P atomic ratio in the range 0.95 to 1.05, the water contents of the removed aqueous slurry and the secondary acid feed being such that the resulting product starts to solidify in a moisture disengagement unit where it is treated for a sufficient period of time for said product to be solid at ambient temperature whereby extra milling of the product is avoided.

4,017,589
PRODUCTION OF AMMONIUM POLYPHOSPHATES FROM MELAMINE PHOSPHATES

John F. McCullough, Florence, and Richard C. Sheridan, Sheffield, both of Ala., assignors to Tennessee Valley Authority, Muscle Shoals, Ala.

Continuation of Ser. No. 619,710, Oct. 6, 1975, now Defensive Publication T952,008. This application Mar. 17, 1976, Ser. No. 667,553
Int. Cl.² C01B *15/16, 25/26*
U.S. Cl. 423—315 6 Claims

1. A process for manufacturing short-chain ammonium polyphosphates, which process comprises the steps of:

1. heating melamine orthosphosphate in an atmosphere of ammonia to a temperature between 150° and 210° C for a predetermined time sufficient to convert said melamine phosphate to crystalline melamine and ammonium polyphosphates;

2. separating said crystals of melamine formed by the reaction of said ammonia with said melamine orthophosphate in step 1, supra, and recovering said ammonium polyphosphates as product.

4,017,590
PREPARATION OF SYNTHETIC FERRIERITE

William E. Cormier, Worcester, and Leonard B. Sand, Holden, both of Mass., assignors to Zeochem Corporation, Worcester, Mass.

Continuation of Ser. No. 469,660, May 14, 1974, abandoned. This application Apr. 15, 1976, Ser. No. 677,263
Int. Cl.² C01B *33/28*
U.S. Cl. 423—329 1 Claim

1. A method of synthesizing a zeolite having the structure of ferrierite, comprising the steps of:

a. preparing a mixture including a source of silicon, a source of aluminum, a source of water, a source of sodium, and a source of potassium; and

b. allowing the mixture to react in the presence of carbon dioxide in the pressure vessel, wherein the mixture contains a carbonate-bicarbonate buffer pair, wherein the composition of the mixture as expressed in mole oxide ratios is

$$\frac{Na_2O + K_2O}{Al_2O_3} = \text{approximately } 3.26$$

$$\frac{CO_2 + HCO_3}{Al_2O_3} = \text{approximately } 5.7$$

$$\frac{SiO_2}{Al_2O_3} = \text{approximately } 13.5$$

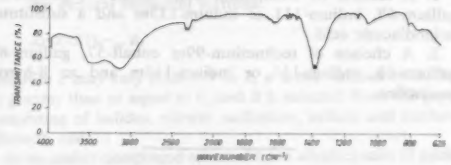
$$\frac{H_2O}{Al_2O_3} = \text{approximately } 130.4$$

wherein the mixture before reaction contained no ferrierite, and wherein the mixture is held at 230° C to 310° C for 3 to 101½ hours.

4,017,591
PROCESS UTILIZING ACTIVATED ALUMINUM AND PRODUCTS PRODUCED THEREBY

George G. Merkl, 46 Sunset Court, Haworth, N.J. 07641

Continuation-in-part of Ser. No. 389,797, Aug. 20, 1973, abandoned, and a continuation-in-part of Ser. No. 389,998, Aug. 20, 1973, abandoned. This application Mar. 8, 1976, Ser. No. 664,999
Int. Cl.² C01B *21/20*
U.S. Cl. 423—387 26 Claims



1. A process for producing an aluminum containing reaction product which comprises:

reactively contacting in an aqueous medium

a. activated aluminum comprising aluminum metal, at least 99.9% by weight pure, which has been permeated with from about 0.1% to about 5.0% by weight of mercury; and

b. a source of NO_x;

said process being carried out according to the following sequence:

i. adding said activated aluminum to said aqueous reaction medium;

iii. adding said source of NO_x to said aqueous reaction medium in an amount to establish a pH in said aqueous reaction medium of at least about 1.5 and at a rate to maintain the temperature of said aqueous reaction medium below about 105° F during addition of said source of NO_x, the reaction of said source of NO_x with the aluminum in said aqueous reaction medium being accompanied by an increase in the pH of said aqueous reaction medium;

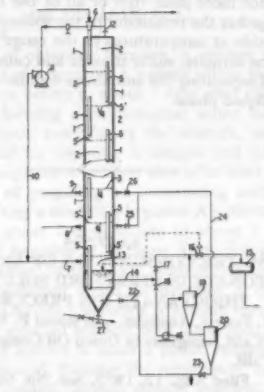
iii. continuing the reaction while maintaining the temperature below the boiling point of the aqueous reaction medium until the specific gravity of the aqueous reaction medium is within the range of about 1.1 to 1.5; and

iv. terminating the reaction by withdrawal of any unreacted activated aluminum from the aqueous reaction medium before the specific gravity of said aqueous reaction medium exceeds about 1.5 and before the pH of the aqueous reaction medium exceeds about pH 4.5.

4,017,592
PROCESS FOR PRODUCTION OF AQUEOUS HYPOCHLOROUS ACID SOLUTION

Herbert F. L. Pénard, Bussum, and Johannis I. Risseeuw, Maarssen, both of Netherlands, assignors to Comprimo N.V., Amsterdam, Netherlands

Filed May 11, 1972, Ser. No. 252,453
Claims priority, application Netherlands, May 12, 1971, 7106494
Int. Cl.² C01B *11/04*
U.S. Cl. 423—473 5 Claims



1. A method of reacting a gas with at least one of the phases of a mixture of solids and liquid, which comprises feeding a fluid suspension of the solids in the liquid continuously into the highest reaction zone of a series of reaction zones disposed vertically one above another, in each of said zones maintaining a layer of suspension at a predetermined depth and as the volume of suspension therein exceeds said depth overflowing the excess suspension in a stream thereof conducted into the layer of suspension in the next lower reaction zone and, in the case of the lowest of said zones, conducted into a collecting space below it, the respective overflow streams from successive reaction zones being spaced horizontally away from each other, flowing gas continuously upwardly through the respective layers of suspension in said zones in succession and subdividing the gas flow entering each of said layers into a multiplicity of gas streams having a velocity sufficient for turbulently agitating the suspension in the layer, the gas upflow through at least a plurality of said layers containing the reactant gas, and continuously taking off residual gas from said highest reaction zone, each of said overflow streams being conducted from the surface of the layer of suspension in one

reaction zone into a bottom region of the layer of suspension in the next lower reaction zone at a location in the latter layer spaced horizontally away from the locations of entry of said gas streams thereinto, said suspension being an aqueous suspension of finely divided limestone and said gas consisting predominantly of chlorine, whereby a reacted suspension containing hypochlorous acid in aqueous solution is obtained in said collecting space.

4,017,593

MANUFACTURE OF SODIUM DITHIONITE

Erfried Voelkl, Frankenthal; Siegfried Schreiner, Ludwigshafen; Gerd Wunsch, Speyer; Volker Kiener; Rudi Waibel, both of Ludwigshafen, and Hartwig Koester, Frankenthal, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen (Rhine), Germany

Filed Aug. 12, 1975, Ser. No. 603,856

Claims priority, application Germany, Sept. 5, 1974, 2442418

Int. Cl.² C01B *17/66*

U.S. Cl. 423—515 7 Claims

1. A process for the manufacture of anhydrous sodium dithionite by the reaction of sodium formate, sulfur dioxide and caustic soda which comprises adding to an initial volume of a liquid mixture of an organic solvent and water having dissolved therein all of the caustic soda required for the reaction and not more than 70% of all of the formate required, adding together the remainder of the sodium formate and the sulfur dioxide at temperatures in the range of 67° to 80° C., reacting the formate, sulfur dioxide and caustic soda at 67° to 85°C., and separating the anhydrous sodium dithionite formed from the liquid phase.

4,017,594

REDUCING THE CONSUMPTION OF ANTHRAQUINONE DISULFONATE IN STRETFORD SOLUTIONS USING THIOCYANATE ION PRECURSORS

Donald M. Fenton, Anaheim, and Raoul P. Vaell, Los Angeles, both of Calif., assignors to Union Oil Company of California, Brea, Calif.

Filed Aug. 12, 1975, Ser. No. 604,006

Int. Cl.² C01B *17/04*

U.S. Cl. 423—573 R 11 Claims

1. In the process for treating a hydrogen sulfide-containing gas to convert the hydrogen sulfide to elemental sulfur in which said gas is contacted with an aqueous alkaline washing solution comprising a water-soluble metal vanadate and a water-soluble anthraquinone disulfonate to yield an effluent gas of reduced sulfur content, the solution is thereafter regenerated by contact with an oxide-containing gas, elemental sulfur is recovered from said solution and said regenerated solution is recycled to said gas-contacting step, and in which said hydrogen sulfide-containing gas is deficient in thiocyanate ion precursors and the concentration of thiocyanate ion in said solution is insufficient to prevent chemical consumption of said anthraquinone disulfonate, the improvement which comprises the step of adding a thiocyanate ion precursor to said washing solution to increase the concentration of thiocyanate ion in said washing solution, said thiocyanate ion precursor being selected from the group consisting of the alkali metal and ammonium thiocyanates and the alkali metal and ammonium cyanides, whereby the concentration of said thiocyanate ion in said washing solution is increased and the consumption of said anthraquinone disulfonate is reduced.

4,017,595

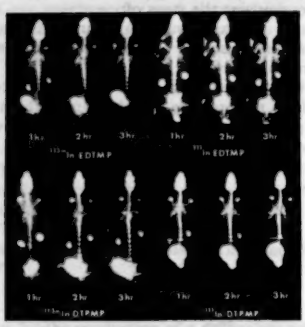
BONE-SEEKING INDIUM-113M OR INDIUM-111 ORGANIC PHOSPHONATE COMPLEXES

Gopal Subramanian, Manlius, and John Gilmour McAfee, Fayetteville, both of N.Y., assignors to Research Corporation, New York, N.Y.

Filed Aug. 28, 1975, Ser. No. 608,695

Int. Cl.² A61K *29/00, 43/00*

U.S. Cl. 424—1 14 Claims



1. A bone-seeking skeletal imaging agent comprising a complex of Indium-113m or Indium-111 with ethylene diamine tetra (methylene phosphonic) acid, diethylene triamine penta(methylene phosphonic) acid, or a salt thereof with a pharmaceutically acceptable cation.

4,017,596

RADIOPHARMACEUTICAL CHELATES AND METHOD OF EXTERNAL IMAGING

Michael Dewey Loberg, Baltimore; Patrick Stephen Callery, Timonium, and Malcolm Cooper, Reisterstown, all of Md., assignors to Research Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 555,037, March 3, 1975, abandoned. This application Sept. 2, 1975, Ser. No. 609,545

Int. Cl.² A61K *43/00, 29/00;* C07C *101/02;* G01T *1/16*

U.S. Cl. 424—1 13 Claims

1. A chelate of technetium-99m, cobalt-57, gallium-67, gallium-68, indium-111 or indium-113m and a substituted iminodiacetic acid.

2. A chelate of technetium-99m cobalt-57, gallium-67, gallium-68, indium-111 or indium-113m and an 8-hyroxyquinoline.

4,017,597

UNITIZED SOLID PHASE IMMUNOASSAY KIT AND METHOD

John H. Reynolds, Baltimore, Md., assignor to Monsanto Company, St. Louis, Mo.

Filed Oct. 30, 1974, Ser. No. 519,317

Int. Cl.² A61k *43/00;* G01N *33/00;* A61B *10/00;* C12K *1/04*

U.S. Cl. 424—1.5 33 Claims

1. A means for use in the immunoassay of a component of the antigen-antibody reaction comprising a surface within a receptacle to at least a part of which one of the components in solid form is bound and in proximity to which the other component is present in labelled and in solid form but not bound, said components being present within said receptacle under conditions substantially impervious to the ambient atmosphere.

4,017,598
PREPARATION OF READILY DISINTEGRABLE TABLETS

Shigeru Ohno, Kamakura; Noboru Hoshi, Higashikurume, and Fujio Sekigawa, Yono, all of Japan, assignors to Shin-Etsu Chemical Company Limited, Tokyo, Japan

Filed Apr. 22, 1975, Ser. No. 570,959
Claims priority, application Japan, Apr. 27, 1974, 49-47875
Int. Cl.² A61J 3/10; A61K 47/00
U.S. Cl. 424—35 9 Claims

1. A method for the preparation of readily disintegrable tablets which comprises the steps of (a) granulating powdery methylcellulose wetted with a mixed solvent of water and and an alcohol selected from the group consisting of methanol, ethanol and propanol in a ratio of from 9:1 to 1:9 by weight into granules, (b) admixing a disintegrator selected from the group consisting of a microcrystalline cellulose, calcium salt of carboxymethylcellulose, methylcellulose with the degree of substitution in the range of from 0.1 to 1.2, hydroxypropylcellulose with the molar substitution in the range of from 0.1 to 1.2 and hydroxypropylmethylcellulose with the degree of molar substitution for the methoxy groups and hydroxypropoxy groups in the range of from 0.1 to 1.2 with said granules in an amount of from 3% to 200% by weight based on said granules to form a blend, and (c) shaping said blend into tablets.

4,017,599
ALUMINUM-ZIRCONIUM ANTI-PERSPIRANT SYSTEMS WITH SALTS OF AMINO ACIDS

Andrew M. Rubino, New Providence, N.J., assignor to Armour Pharmaceutical Company, Phoenix, Ariz.

Filed Nov. 23, 1973, Ser. No. 418,712
Int. Cl.² A61K 7/34
U.S. Cl. 424—47 20 Claims

1. An astringent, water soluble complex formed by reacting in an aqueous solution:

a. a basic aluminum compound selected from the group having the general empirical formula:

$$Al_2(OH)_{6-nx}A_x$$

wherein x may vary from greater than 0 to less than 6, $6-nx$ is greater than or equal to 0, n is the valence of A, and A is selected from the group consisting of halides, nitrate, sulfamate, sulfate and mixtures thereof;

b. a zirconium compound selected from the group having the general empirical formula:

$$ZrO(OH)_{2-nz}B_z$$

wherein z may vary from 0.9 to 2, n is the valence of B, $2-nz$ is greater than or equal to 0, and B is selected from the group consisting of halides, nitrate, sulfamate, sulfate and mixtures thereof; and

c. an amino compound selected from alkaline salts of amino acids, said alkaline salts of amino acids being derived from amino acids in which the number of a amino groups is equal to the number of carboxyl groups in the molecule; said zirconium and basic aluminum compounds being present in such amounts as to yield an Al/Zr mole ratio of about 10:1 to 1:10, and said amino compound being present in such an amount that the pH of a 5 to 15 weight percent (based on the oxides of Al and Zr) aqueous solution of the complex is at least about 3.

11. An astringent complex according to claim 1 wherein said complex is in the form of a powder.

14. A powder-in-oil antiperspirant composition comprising an aerosol propellant and the complex according to claim 11 wherein said complex is present in an amount such that the total aluminum plus zirconium present in the antiperspirant composition, calculated as the oxides, is about 1–6 weight percent.

4,017,600
REACTIVATION OF INTERFERON

William Edgar Stewart, Herent, and Pierre Marie Hendrik Frans de Somer, Leuven, both of Belgium, assignor to Stichting REGA V.Z.W.

Filed Apr. 3, 1975, Ser. No. 564,726
Claims priority, application Netherlands, Apr. 3, 1974, 7404590
Int. Cl.² A61K 45/02
U.S. Cl. 424—85 11 Claims

1. A method of reactivating interferon, comprising the following steps:

a. providing an aqueous interferon solution which has lost at least part of its initial activity; and

b. treating said interferon solution with a combination of:

i. urea or guanidine-hydrochloride as an agent for disrupting non-covalent bonds,

ii. mercaptoethanol or ethanethiol as an agent for reducing disulfide bridges, and

iii. a surface-active agent selected from the group consisting of sodium dodecylsulfate, sodium decylsulfate, sodium dodecylsulfonate, dodecylamine and decylamine, so as to obtain an aqueous interferon solution which has been reactivated substantially to its initial activity.

4,017,601
HEPATITIS A ANTIGEN

Maurice R. Hilleman, Lafayette Hill; William J. Miller, North Wales, and Philip J. Provost, Harleysville, all of Pa., assignors to Merck & Co., Inc., Rahway, N.J.

Filed Oct. 16, 1975, Ser. No. 623,184
Int. Cl.² A61K 39/12
U.S. Cl. 424—89 8 Claims

1. A method of obtaining hepatitis A antigen comprising collecting a stool of a hepatitis A patient within the period of from about 7 days before to about 7 days after clinical onset of hepatitis A, forming a physiological saline homogenous extract of the stool, centrifuging the mixture, assaying the supernatant liquid for hepatitis A antigen and selecting extracts having a hepatitis A antigen titer of at least 1:4.

3. A method of preparing an immunizing antigen which comprises collecting a stool of a hepatitis A patient within the period of from about 7 days before to about 7 days after clinical onset of hepatitis A, forming a physiological saline homogeneous extract of the stool, centrifuging the mixture, assaying the supernatant liquid for hepatitis A antigen and selecting extracts having a hepatitis A antigen titer of at least 1:4, treating the selected extracts with ultrasound, centrifuging the sonicated extract to form a pellet, resuspending the pellet with ultrasound, filtering the suspension, centrifuging the filtrate in a cesium chloride density gradient, collecting fractions having densities of from about 1.32 to about 1.36 g/cm³, dialyzing the fractions against distilled water, extracting the fractions with ether, acidifying the aqueous phase to from about pH 2 to about pH 4, holding at ambient temperature for from about 1 to about 5 hours, adjusting the pH to about 7.0, heating to from about 50 to about 65° C. for from about 0.5 to about 2 hours, clarifying by centrifugation and treating the supernate with formaldehyde.

4,017,602
PROCESS FOR PREPARING PRODUCTS FOR USE IN AEROSOL FORM

Jean Cazorla, and Yves Tillon, both of Bernay, France, assignors to Roger & Gallet, Paris, France

Filed Aug. 15, 1975, Ser. No. 605,089
Claims priority, application France, Aug. 28, 1974, 74.29386
Int. Cl.² A61L 9/04
U.S. Cl. 424—44 13 Claims

1. A process for the preparation of products for use in aerosol form comprising the preparation of a base composi-

tion, the introduction of this composition into an aerosol container and the use of a propellant, wherein the composition is previously inoculated by organisms able to bring about fermentation with the giving off within the container of carbondioxide gas which serves as the propellant.

4,017,603

WATER-SOLUBLE PHARMACEUTICAL COMPLEXES OF PARTRICIN OR AN ALKYL ESTER THEREOF WITH SODIUM DESOXYCHOLATE OR SODIUM DEHYDROCHOLATE

Rodolfo Ferrari, and Ernani Dell'Acqua, both of Milan, Italy, assignors to SPA-Societa Prodotti Antibiotici S.p.A., Milan, Italy

Filed Aug. 29, 1975, Ser. No. 609,143

Claims priority, application United Kingdom, Sept. 3, 1974, 38412/74

Int. Cl.² A61K *35/00*

U.S. Cl. 424—122 **4 Claims**

1. A water-soluble pharmaceutical complex, comprising an antibiotic selected from the group consisting of partricin, partricin methyl ester and partricin ethyl ester and a complex-forming compound selected from the group consisting of sodium desoxycholate and sodium dehydrocholate, wherein the weight ratio of the antibiotic to the complex-forming compound is about 1:1, said partricin having an Rf value of about 0.50 on silica gel using butanol-ethanol-acetone-25% ammonium hydroxide in a ratio of 2:5:1:3 as eluent, ultraviolet absorption maxima at 410, 379, 359 and 341 mμ in ethanol at a concentration of about 0.01 mg/ml, infrared absorption maxima at 3355, 1704, 1596, 1175, 1070, 995 and 850 cm^{-1} in nujol, and an elemental analysis of C = 62.8%, H = 7.9%, N= 3.2% and O =25.2%

said complex having an ultraviolet absorption spectrum and Rf value equal to the ultraviolet absorption spectrum and Rf value of the antibiotic alone.

4,017,604

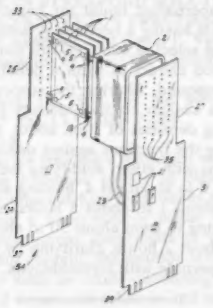
MAGNETIC BUBBLE CHIP PACKAGING ASSEMBLY

Rex Alan Naden, and Terry Wayne Noe, both of Richardson, Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Mar. 3, 1975, Ser. No. 554,955

Int. Cl.² G11C *11/14*

U.S. Cl. 340—174 TF **11 Claims**



1. A packaging assembly for magnetic bubble chips comprising:

a plurality of parallel module assembly boards having a surface to which is secured in a substantially planar array a plurality of magnetic bubble chips for the storing and processing of information;

first and second sets of terminals located on opposed lateral edges of each of said module assembly boards for the routing therethrough of electrical signals to and from said chips;

first and second mounting boards positioned in spaced parallel registering relationship with each other, each board having respective sets of receptacle means for soldering thereto of a corresponding set of said terminals of each of said module assembly boards, said module assembly boards extending between said mounting boards in transverse relationship thereto and being secured to said mounting boards by soldered connections between the sets of terminals and receptacle means;

coil means surrounding said plurality of module assembly boards and wound about an axis parallel to the planes of said chips on said module assembly boards for producing a magnetic field parallel thereto;

bias field means positioned exterior to said coil means for producing a substantially constant magnetic field perpendicular to the planes of said chips on said module assembly boards;

means for exciting said coil means to produce a rotating magnetic field parallel to the planes of said chips on said module assembly boards to control the movement of magnetic bubbles therein; and

means for controlling the storage and processing of information in said chips whereby convenient access to the chips may be gained by sequential disassembly of said bias field means, said coil means, and reheating of the solder connections between the terminals and receptacle means for each respective module assembly board.

4,017,605

ACYLATED ORGOTEIN

Wolfgang Huber, Atherton; Mark G. Saifer, Berkeley, and Lewis D. Williams, Menlo Park, all of Calif., assignors to Diagnostic Data, Inc., Mountain View, Calif.

Filed Sept. 20, 1974, Ser. No. 507,685

Int. Cl.² C07G *7/04*

U.S. Cl. 424—177 **12 Claims**

1. N-acyl orgotein wherein the acyl group is present on at least one lysine ε-amino group and is the acyl radical of a mono- or di-basic hydrocarbon carboxylic acid of up to 8 carbon atoms.

4,017,606

ORGANIC COMPOUNDS AND PROCESS

Arthur R. Hanze, Kalamazoo, and Gerald W. Camiener, Portage, both of Mich., assignors to The Upjohn Company, Kalamazoo, Mich.

Continuation of Ser. No. 403,676, Oct. 4, 1973, abandoned, which is a continuation of Ser. No. 169,535, Aug. 5, 1971, abandoned, which is a continuation of Ser. No. 870,155, June 27, 1969, abandoned, which is a division of Ser. No. 665,244, Sept. 5, 1967, Pat. No. 3,462,416, which is a continuation-in-part of Ser. No. 636,608, May 18, 1967, abandoned, which is a continuation-in-part of Ser. No. 612,331, Jan. 30, 1967, abandoned. This application Mar. 28, 1975, Ser. No. 563,043

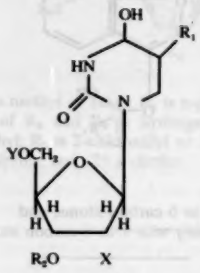
Int. Cl.² A61K *31/70*

U.S. Cl. 424—180 **5 Claims**

1. A pharmaceutical preparation comprising:

a. 1-β-D-arabinofuranosylcytosine or a pharmaceutically acceptable acid addition salt thereof, and

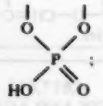
b. A compound of the formula:



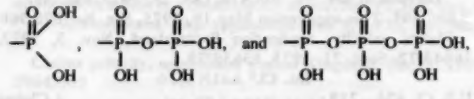
wherein R_1 is selected from the group consisting of hydrogen, methyl, hydroxymethyl, chlorine, fluorine and $-CF_3$; wherein R_2 is selected from the group consisting of hydrogen, Ac in which Ac is the acyl group of a hydrocarbon carboxylic acid containing from 2 to 12 carbon atoms, inclusive, and

wherein X is selected from the group consisting of hydrogen, hydroxy, OAc in which Ac is defined as above, and

and wherein X and OR_2 together can be



wherein Y is selected from the group consisting of hydrogen, Ac defined as above,



wherein the ratio of 1-β-D-arabinofuranosylcytosine to the compound selected from (b) above is between 1,000:1 and 1:10.

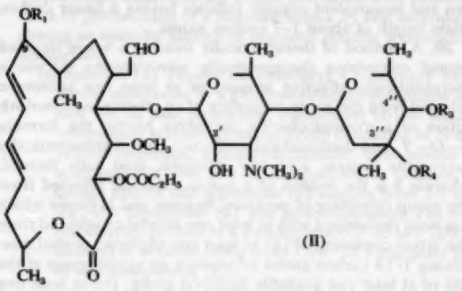
4,017,607

9,3'',4''-TRIACYL ESTER OF THE ANTIBIOTIC SF-837 M, SUBSTANCE AND THE PRODUCTION THEREOF

Shigeharo Inouye, Yokohama; Shoji Omoto, Tokyo; Katsuyoshi Iwamatsu, Ayase; Takashi Tsuruoka, Kawasaki; Taro Niida, Yokohama, and Toyoaki Kawasaki, Tokyo, all of Japan, assignors to Meiji Seika Kaisha, Ltd., Tokyo, Japan

Continuation-in-part of Ser. No. 475,311, May 31, 1974, abandoned. This application July 18, 1975, Ser. No. 597,188
Claims priority, application Japan, Aug. 27, 1974, 49-97485
Int. Cl.[2] C07H *17/08*
U.S. Cl. 424—180 8 Claims

1. A 9,3'',4''-tri-alkanoyl SF-837 M_1 substance of the formula (II):



(II)

wherein R_1 and R_4 are each acetyl or propionyl and R_3 is acetyl, propionyl, n-butyryl, isobutyryl or isovaleryl.

7. A pharmaceutical composition suitable for use in treating bacterial infections in a living animal, comprising a therapeutically effective amount of a compound selected from the group consisting of 9,3'',4''-tri-alkanoyl SF-837 M_1 substance of the formula (II) as claimed in claim 1 (and/or), a pharmaceutically acceptable salt thereof and a mixture of said substance and said salt of the 9,3'',4''-tri-alkanoyl SF-837 M_1 substance, in combination with a pharmaceutically acceptable carrier.

4,017,608

THERAPEUTIC COMPOSITION AND METHOD OF THERAPEUTICALLY TREATING WARM BLOODED ANIMALS THEREWITH

Paul Gordon, Chicago, Ill., assignor to Strategic Medical Research Corporation, Murray, Utah

Division of Ser. No. 424,786, Dec. 14, 1973, Pat. No. 3,939,146, which is a continuation-in-part of Ser. No. 337,134, March 1, 1973, Pat. No. 3,939,145. This application Sept. 2, 1975, Ser. No. 609,724
Int. Cl.[2] A61K *31/70*
U.S. Cl. 424—180 52 Claims

1. A novel therapeutic composition comprising a pharmaceutically acceptable carrier containing a therapeutically effective amount of at least one substance selected from the group consisting of an etheral monosubstitution of a monosaccharide derivative having the formula S—O—Y, and therapeutically effective and pharmaceutically acceptable organic acid and inorganic acid salts thereof, wherein S is the residue of a monosaccharide selected from the group consisting of pentoses, hexoses and heptoses which has been derivatized with at least one substance selected from the group consisting of (a) at least one aliphatic alcohol containing 1–18 carbon atoms to produce an acetal group at the site of at least one available hydroxyl group, (b) at least one aldehyde containing 1–18 carbon atoms to produce at least one acetal group at the site of at least one available hydroxyl group, (c) at least one ketone containing 1–18 carbon atoms to produce at least one ketal group at the site of at least one available hydroxyl group, and (d) at least one organic acid residue containing 1–18 carbon atoms to produce an ester group at the site of at least

one available hydroxyl group, and Y is selected from the group consisting of cyclic monovalent nitrogen containing organic radicals and monovalent organic radicals having the formula

wherein R_1 is a divalent organic radical having a linear crbon chain length of about 1–7 carbon atoms and R_2 and R_3 are selected from the group consisting of —H,—OH, —SH, halogen and monovalent organic radicals having a linear carbon chain length of about 1–7 carbon atoms.

20. A method of therapeutically treating a warm blooded animal comprising therapeutically administering thereto a therapeutically effective amount of at least one substance selected from the group consisting of an ethereal monosubstitution of a monosaccharide derivative having the formula S—O—Y, and therapeutically effective and pharmaceutically acceptable organic acid and inorganic acid salts thereof, wherein S is the residue of a monosaccharide selected from the group consisting of pentoses, hexoses and heptoses which has been derivatized with at least one substance selected from the group consisting of (a) at least one aliphatic alcohol containing 1–18 carbon atoms to produce an acetal group at the site of at least one available hydroxyl group, (b) at least one aldehyde containing 1–18 carbon atoms to produce at least one acetal group at the site of at least one available hydroxyl group, (c) at least one ketone containing 1–18 carbon atoms to produce at least one ketal group at the site of at least one available hydroxyl group, and (d) at least one organic acid residue containing 1–18 carbon atoms to produce an ester group at the site of at least one available hydroxyl group, and Y is selected from the group consisting of cyclic monovalent nitrogen containing organic radicals and monovalent organic radicals having the formula

wherein R_1 is a divalent organic radical having a linear carbon chain length of about 1–7 carbon atoms and R_2 and R_3 are selected from the group consisting of —H,—OH, —SH, halogen and monovalent organic radicals having a linear carbon chain length of about 1–7 carbon atoms.

4,017,609

O-ALKYL-O-[7-NITROBENZISOXAZOL(3)YL]-THIONOPHOSPHORIC (PHOSPHONIC) ACID ESTERS

Walter Lorenz, Wuppertal; Ingeborg Hammann, Cologne, and Wilhelm Stendel, Wuppertal, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

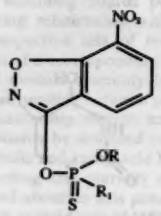
Filed Dec. 8, 1975, Ser. No. 638,876

Claims priority, application Germany, Dec. 11, 1974, 2458626

Int. Cl.² C07D *261/20*

U.S. Cl. 424—200 **8 Claims**

1. An O-alkyl-O-[7-nitrobenzisoxazol (3)yl]-thionophosphoric(phosphonic) acid ester of the formula



in which

R is alkyl with 1 to 6 carbon atoms, and

R_1 is alkyl or alkoxy with 1 to 6 carbon atoms, or phenyl.

4,017,610

INHIBITING GROWTH OF BACTERIA, FUNGI AND ALGAE WITH A LOWER ALKYL TRI-N-OCTYL PHOSPHONIUM DIPHENYL PHOSPHATE

Don R. Baker, Orinda, Calif., assignor to Stauffer Chemical Company, Westport, Conn.

Filed Oct. 31, 1975, Ser. No. 627,564

Int. Cl.² A01N *9/36*; A61L *1/00*, *13/00*

U.S. Cl. 424—204 **3 Claims**

1. A method of inhibiting the growth of sulfate-reducing bacteria which comprises applying thereto an effective amount of a lower alkyl tri-n-octyl phosphonium diphenyl phosphate.

4,017,611

CONTROL OF INSECTS WITH 3-HYDROXYMETHACRYLIC ACID METHYL ESTER DIMETHYLTHIONOPHOSPHATE

Ernst Beriger, Neuallschwil, and Ladislaus Pinter, Basel, both of Switzerland, assignors to Ciba-Geigy AG, Basel, Switzerland

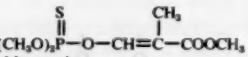
Division of Ser. No. 348,426, April 5, 1973, Pat. No. 3,923,932, which is a continuation of Ser. No. 136,193, April 21, 1971, abandoned. This application Oct. 10, 1975, Ser. No. 621,454

Claims priority, application Switzerland, Apr. 21, 1970, 6028/70

Int. Cl.² A01N *9/36*

U.S. Cl. 424—212 **2 Claims**

1. An insecticidal composition which comprises (1) as an active component an insecticidally effective amount of the compound of the formula



and (2) a suitable carrier.

4,017,612

COMBATTING INSECTS AND ACARIDS WITH CERTAIN O-METHYL/ETHYL-S-PROPYL/BUTYL-O-PHENYL-THIOPHOSPHATES AND -DITHIOPHOSPHATES

Ernst Beriger, Allschwil, Switzerland; Manfred Böger, Haltingen, Germany; Jozef Drabek, Allschwil, and Odd Kristiansen, Reinach, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

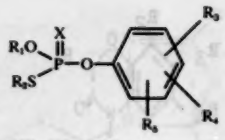
Division of Ser. No. 408,874, Oct. 23, 1973, Pat. No. 3,898,305. This application May 19, 1975, Ser. No. 578,960

Claims priority, application Switzerland, Nov. 3, 1972, 16043/72; Sept. 21, 1973, 13638/73

Int. Cl.² A01N *9/36*

U.S. Cl. 424—219 **4 Claims**

1. An insecticidal and acaricidal composition comprising (1) an insecticidally or acaricidally effective amount of a compound of formula



wherein R_1 is methyl or ethyl; R_2 is n-propyl, isobutyl or sec. butyl; each of R_3 and R_4 is hydrogen, chlorine, bromine, methyl or ethyl; R_5 is 2-chloroallyl or 3-chloroallyl, and X is oxygen or sulphur; and (2) a carrier.

4,017,613

2,4,4-TRICHLOROBUTADIENYL-1-PHOSPHATES AND PHOSPHONATES AND PESTICIDES MADE THEREFROM

Wolfgang Deinhammer, Munich; Marco Vulić, Freising; Manfred Wick, Munich, and Helmut Prigge, Wolfratshausen-Farchet, all of Germany, assignors to Consortium fur Elektrochemische Industrie GmbH, Munich, Germany

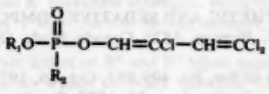
Filed Oct. 20, 1975, Ser. No. 623,850

Claims priority, application Germany, Oct. 31, 1974, 2451943

Int. Cl.² A01N *9/36*; C07F *9/09*

U.S. Cl. 424—219 **21 Claims**

1. A compound of the formula:



wherein R_1 is selected from the group consisting of alkyl having 1 to 4 carbon atoms and alkenyl having 2 to 4 carbon atoms; R_2 is selected from the group consisting of straight-chain alkyl having 1 to 4 carbon atoms, alkoxy having 1 to 4 carbon atoms, alkenyloxy having 2 to 4 carbon atoms, and phenyl.

2. A method of combating pests in a crop area which comprises applying to the crop area a compound as recited in claim 1 in an amount of from 0.1 to 10 kg/ha.

4,017,614

COMPOSITIONS FOR THE RELIEF OF MIGRAINE

Henry Wild, 8 Winster Place, Mereside, Blackpool, Lancashire, England

Continuation of Ser. No. 504,781, Sept. 10, 1974, abandoned, which is a continuation of Ser. No. 301,906, Oct. 31, 1972, abandoned, which is a continuation of Ser. No. 95,361, Dec. 4, 1970, abandoned. This application Dec. 5, 1975, Ser. No. 638,006

Claims priority, application United Kingdom, Dec. 5, 1969, 59643/69

Int. Cl.² A61K *31/625*

U.S. Cl. 424—232 **16 Claims**

1. A method for preventing or diminishing the severity of a migraine attack of a migraneous individual comprising prophylactically administering to said individual after onset of an aura or premonition of a migraine attack by said individual or during an episodic pattern of migraine attacks, a composition comprising:

a. 1-p-chlorobenzhydryl 4-p-(tertiary butyl)-benzyl piperazine or a pharmaceutically acceptable addition salt of said piperazine and (b) a compound selected from the group consisting of N-acetyl-p-aminophenol, p-ethoxy-acetanilide, salicylamide and acetylsalicylic acid, the piperazine (a) and the compound (b) being respectively present in a weight ratio of 1:20 to 1:200, the dosage unit of said piperazine (a) ranging from 2.5 to 24 mg.

12. A method for preventing or diminishing the severity of a migraine attack of a migraneous individual comprising prophylactically administering to said individual after onset of an aura or premonition of a migraine attack by said individual or during an episodic pattern of migraine attacks, a composition comprising

component (a) 1-p-chlorobenzhydryl 4-p-(tertiary butyl)-benzyl piperazine or a pharmaceutically acceptable addition salt of said piperazine, component (b) at least wo compounds selected from the group consisting of N-acetyl-p-aminophenol, p-ethoxyacetanilide, salicylamide and acetylsalicylic acid and as component (c) codeine, the dosage unit of said piperazine (a) ranging from 2.5 to 24 mg., the piperazine (a) and said component (b) being respectively present in a weight ratio of 1:20 to 1:200, the amound of codeine being from 7.5 to 22.5 mg. per 1 gram of said component (b).

4,017,615

PROPYLENE CARBONATE OINTMENT VEHICLE

Subramaniam Shastri, Cupertino, and Zafaruzzaman I. Shaikh, Palo Alto, both of Calif., assignors to Syntex Corporation, Panama, Panama

Division of Ser. No. 85,246, Oct. 29, 1970, abandoned. This application Dec. 11, 1975, Ser. No. 639,740

Int. Cl.² A61K *31/58*

U.S. Cl. 424—241 **7 Claims**

1. An ointment comprising an ointment base consisting essentially of

a. from 0.5 to 30 weight percent propylene carbonate;

b. from 30 to 99.5 weight percent petrolatum, polysiloxane having a viscosity of from 0.5 to 10^6 centistokes, or mixtures thereof;

c. compatible co-solvent, the concentration of which in combination with the propylene carbonate is from 0.5 to 70 weight percent;

d. from 0 to 45 weight percent pharmaceutically acceptable surfactant;

e. from 0 to 20 weight percent thickener; and

f. from 0 to 25 weight percent penetrant

in combination with a therapeutically effective amount of a propylene carbonate soluble medicament.

4,017,616

PARENTERAL BENZODIAZEPINE COMPOSITIONS

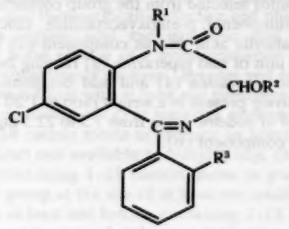
Eloy A. Gomez, West Chester, and Howard J. Levin, Norristown, both of Pa., assignors to American Home Products Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 219,867, Jan. 21, 1972, abandoned. This application Apr. 13, 1973, Ser. No. 351,114

Int. Cl.[2] A61K *31/33*

U.S. Cl. 424—244 **6 Claims**

1. A parenterally acceptable composition comprising from about 10% to about 65% polyethylene glycol, from about 35% to about 90% propylene glycol, from 0% to about 10% benzyl alcohol, and, per ml. of the above solution, from about 1 mg. to about 15 mg. of a benzodiazepine compound of the formula:



wherein R^1 and R^2 are independently hydrogen or methyl, and R^3 is hydrogen or chlorine, said composition being substantially free of water.

4,017,617

Patent Not Issued For This Number

4,017,618

DERIVATIVES OF 3-OXO-2,3-DIHYDRO-1,4-BENZOXAZINE FOR USE AS ANALGESICS AND ANTIOEDEMATOUS AGENTS

Germaine Thuillier, Paris, and Jacqueline Laforest, Vincennes, both of France, assignors to CERPHA, Arcueil, France

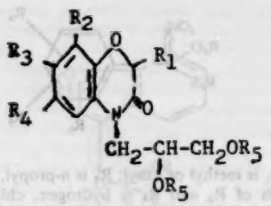
Division of Ser. No. 384,924, Aug. 2, 1973, now U.S. Patent No. 3,935,203. This application May, 20, 1975, Ser. No. 579,213

Claims priority, application France, Aug. 3, 1972, 72.28095

Int. Cl.[2] A01N *9/00; 9/22*

U.S. Cl. 424—248.54 **7 claims**

1. A therapeutic composition, possessing analgesic and antioedematous properties, comprising a therapeutically effective amount of a compound of the formula:



in which R_1 is selected from the group consisting of hydrogen and lower alkyl; R_2, R_3 and R_4, which are identical or different, are selected from the group consisting of hydrogen, halogen, nitro, lower alkyl, and lower alkoxy, and R_4 may also be allyl; and R_5 is selected from the group consisting of hydrogen and acetyl, and a physiologically acceptable vehicle.

4,017,619

ANESTHETIC AND SEDATIVE COMPOSITION

Raymond W. Burnap, 1528 Canada Blvd., Glendale, Calif. 91208

Continuation of Ser. No. 409,893, Oct. 26, 1973, abandoned. This application Sept. 29, 1975, Ser. No. 617,971

Int. Cl.[2] A61K *31/33*

U.S. Cl. 424—244 **1 Claim**

1. A method for inducing anesthesia in a human patient comprising intraveneously administering to saidpatient an anesthetizing amount of an aqueous solution of 5% dextrose, 0.11% sodium chloride, 0.1% 2(-o-chlorophenyl)-2-(methylamino) cyclohexanone hydrochloride and 0.01% 7-chloro-1,3-dihydro-1-methyl-5-phenyl-2-H-1,4-benzodiazepin-2-one.

4,017,620

THIENODIAZEPINE DERIVATIVES

Yutaka Kuwada, Ashiya; Kanji Meguro, Takarazuka; Hiroyuki Tawada; Takashi Sohda, both of Takatsuki; Hideaki Natsugari, Nishinomiya, and Yoshiaki Sato, Kobe, all of Japan, assignors to Takeda Chemical Industries, Ltd., Osaka, Japan

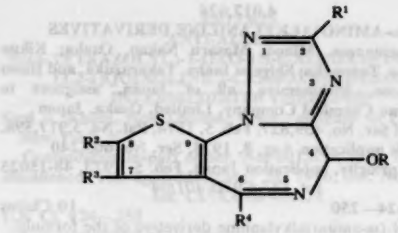
Filed May 8, 1975, Ser. No. 575,727

Claims priority, application Japan, May 13, 1974, 49-53747

Int. Cl.[2] C07D *495/14*

U.S. Cl. 424—248.51 **31 Claims**

1. A compound of the general formula (I):



wherein R^1 represents a carboxyl group —$COOR^5$ in which R^5 is lower alkyl of 1 to 4 carbon atoms or

in which R^6 and R^7 represent hydrogen, straight, branched or cyclic alkyl of 1 to 6 carbon atoms; straight, branched or cyclic alkyl of 1 to 6 carbon atoms substituted by lower alkoxy of 1 to 4 carbon atoms or R^6 and R^7 taken together with the nitrogen atom to which they are attached form members selected from the group consisting of pyrrolidine, piperidine, morpholine, N-methyl piperazine, N-ethyl piperazine, N-propyl piperazine and N-(2-methoxyethyl)-piperazine each of R^2 and R^3 represent a hydrogen atom or a lower alkyl group or R^2 and R^3 taken together forming trimethylene or tetramethylene; R^4 is phenyl or phenyl substituted by halogen, lower alkyl, lower alkoxy, trifluoromethy, or trichloromethyl and R represents hydrogen, —COR^8 in which R^8 is alkyl of 1 to 4 carbon atoms, phenyl, tolyl, benzyl or phenethyl, or alkyl of 1 to 4 carbon atoms or its pharmaceutically acceptable acid addition salts.

4,017,621

2-MORPHOLINYL TRICYCLIC DIBENZAZEPINE COMPOUNDS

Yoshinori Takashima, Nishinomiya; Isamu Maruyama, Minoo, and Junki Katsube, Toyonaka, all of Japan, assignors to Sumitomo Chemical Company, Limited, Japan

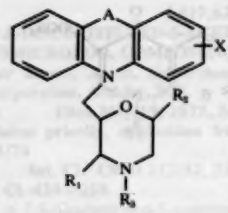
Filed Nov. 26, 1975, Ser. No. 635,355

Claims priority, application Japan, Dec. 9, 1974, 49-141691; Dec. 27, 1974, 50-2911; Apr. 23, 1975, 50-49891

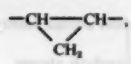
Int. Cl.² C07D *413/06*

U.S. Cl. 424—248.4 **9 Claims**

1. A compound of the formula:



wherein A is —CH_2—CH_2—, —CH=CH— or



X is hydrogen, halogen, nitro, trifluoromethyl, C_1—C_3 alkyl or C_1—C_3 alkoxy, R_1 and R_2 are each hydrogen or C_1—C_4 alkyl and R_3 is hydrogen, C_1—C_4 alkyl, C_3—C_5 alkenyl, C_3—C_5 alkynyl, C_3—C_6 cycloalkyl (C_2—C_3) alkyl, ar(C_1—C_3) alkyl, polyhalo(C_1—C_3)alkyl, C_1—C_4 alkoxy(C_1—C_3) alkyl or hydroxy(C_1—C_3)alkyl, or a non-toxic pharmaceutically acceptable salt thereof.

9. A method for treatment of mental depression which comprises administering to a person an antidepressant effective amount of at least one compound according to claim **1**.

4,017,622

PIPERAZINE DERIVATIVES

Shinsaku Minami, Yamatokouriyama; Jun-Ichi Matsumoto, Takatsuki; Minoru Sugita, Kyoto; Masanao Shimizu, Kobe; Yoshiyuki Takase, Amagasaki, and Shinichi Nakamura, Takatsuki, all of Japan, assignors to Dainippon Pharmaceutical Co., Ltd., Osaka, Japan

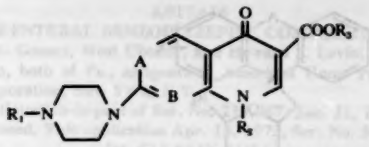
Continuation-in-part of Ser. No. 424,697, Dec. 14, 1973, abandoned. This application Jan. 30, 1975, Ser. No. 545,549

Claims priority, application Japan, Dec. 18, 1972, 47-126968; Dec. 18, 1972, 47-126969; Dec. 21, 1972, 47-128441; Apr. 17, 1973, 48-43388; Oct. 26, 1973, 48-121057; Oct. 26, 1973, 48-121058; Oct. 27, 1973, 48-121006; Nov. 6, 1973, 48-124633

Int. Cl.² C07D *295/10*

U.S. Cl. 424—250 **16 Claims**

1. A compound of the formula



wherein:

A and B are carbon or nitrogen, provided that A and B are not both nitrogen;

R_1 is hydrogen, alkyl having 1 to 4 carbon atoms, benzyl, or acetyl;

R_2 is hydrogen, alkyl having 1to 4 carbon atoms, benzyl, or vinyl and

R_3 is hydrogen or alkyl having 1 to 6 carbon atoms;

or the pharmaceutically acceptable acid addition or alkali metal salts thereof.

4,017,623

ESTERS OF 2-[(4-QUINOLYL)AMINO]-BENZOIC ACIDS IN ANALGESIC AND ANTI-INFLAMMATORY COMPOSITIONS

Don Pierre René Lucien Giudicelli, Fontenay-sous-Bois; Henry Najer, Paris; Philippe Michel Jacques Manoury, L'Hay-les-Roses, and André Pierre Fernand Dumas, Bagneux, all of France, assignors to Synthelabo, Paris, France

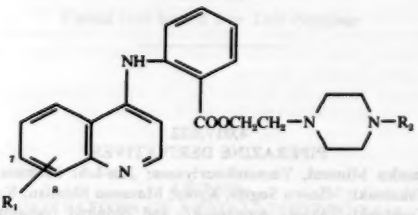
Division of Ser. No. 457,174, April 2, 1974, Pat. No. 3,935,279. This application Nov. 13, 1975, Ser. No. 631,673

Claims priority, application France, Apr. 6, 1973, 73.12505; May 9, 1973, 73.16635; Dec. 17, 1973, 73.44963

Int. Cl.² A61K *31/495*

U.S. Cl. 424—250 **3 Claims**

1. An analgesic and anit-inflammatory composition comprising an analgesic or anti-inflammatory effective amount of a compound of the formula:



wherein

R_1 is chlorine, trifluoromethyl or trifluoromethylthio; and

R_2 is phenyl, chlorophenyl, methylphenyl, trifluoromethylphenyl, trifluoromethoxyphenyl, trifluoromethylthiophenyl, dimethylphenyl, chloromethylphenyl or ditrifluoromethylphenyl, R_2 being a substituted phenyl when R_1 is chlorine,

or of a pharmaceutically acceptable acid addition salt thereof in combination with a pharmaceutically acceptable diluent.

4,017,624

N-(ω-AMINO)ALKYLANILINE DERIVATIVES

Isamu Maruyama, Minoo; Masaru Nakao, Osaka; Kikuo Sasajima, Toyonaka; Shigeho Inaba, Takarazuka, and Hisao Yamamoto, Nishinomiya, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

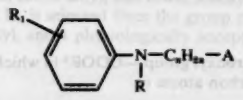
Division of Ser. No. 439,827, Feb. 5, 1974, Pat. No. 3,917,598. This application Aug. 8, 1975, Ser. No. 603,240

Claims priority, application Japan, Feb. 5, 1973, 48-15025

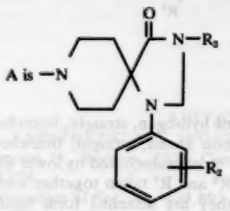
Int. Cl.² C07D *401/04*

U.S. Cl. 424—250 **10 Claims**

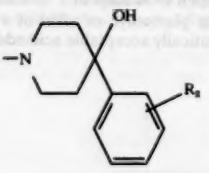
1. An N-(ω-amino)alkylaniline derivative of the formula:



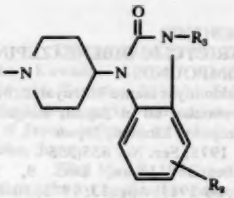
wherein R is hydrogen, C_1–C_7 alkyl, C_1–C_7 alkanoyl, benzoyl, halobenzoyl or nicotinoyl, R_1 is hydrogen, halogen, C_1–C_7 alkyl or C_1–C_7 alkoxy,



wherein R_2 is hydrogen, halogen, C_1–C_7 alkyl, C_1–C_7 alkoxy or trifluoromethyl and R_3 is hydrogen, C_1–C_7 alkyl or C_1–C_7 alkanoyl,



wherein R_2 is as defined above or



wherein R_2 and R_3 are each as defined above, and n is 2, 3 or 4, and non-toxic pharmaceutically acceptable salts thereof.

4,017,625
ANTI-ALLERGIC N-(5-TETRAZOLYL)-1-OXO-1H-6-ALKOXYPYRIMIDO-[1,2-a]QUINOLINE-2-CARBOXAMIDES AND INTERMEDIATES THEREFOR

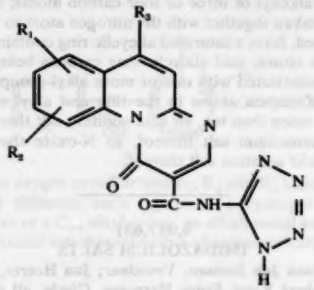
Saul B. Kadin, New London, Conn., assignor to Pfizer Inc., New York, N.Y.

Continuation-in-part of Ser. No. 601,039, Aug. 1, 1975, abandoned. This application May 24, 1976, Ser. No. 689,579

Int. Cl.² C07D *401/14*

U.S. Cl. 424—251 **25 Claims**

1. A compound of the formula



wherein each of R_1 and R_2 is hydrogen, from the group consisting of hydrogen, lower alkyl, lower alkoxy, chloro, and fluoro;

R_1 and R_2 when taken together are alkylenedioxy and are selected from the group consisting of methylenedioxy and ethylenedioxy;

R_3 is selected from the group consisting of chloro, bromo and lower alkoxy;

and the pharmaceutically-acceptable cationic salts thereof.

4,017,626
FUNGICIDALLY ACTIVE URACIL DERIVATIVES

Kailash Kumar Gauri, Lentfohrden, Germany, assignor to Robugen GmbH, Pharmazeutische Fabrik, Esslingen, Germany

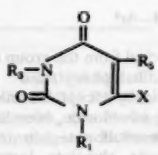
Filed Jan. 14, 1975, Ser. No. 541,047

Claims priority, application Germany, Jan. 14, 1974, 2401619

Int. Cl.² A01N *9/22*

U.S. Cl. 424—251 **4 Claims**

1. A fungicidal composition for inhibiting the growth of dermatophytes comprising an amount effective to inhibit the growth of dermatophytes of a uracil derivative having the formula:



wherein R_1 and R_3 are each an alkyl group of 2 to 10 carbon atoms, R_5 is an alkyl group having 2 to 5 carbon atoms and X is a chlorine atom, and an inert carrier.

4,017,627
7,8-DISUBSTITUTED-5-ACETYLQUINOLINES AND ANTIMICROBIAL COMPOSITIONS CONTAINING THEM

Elmar Sturm, Aesch, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

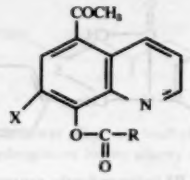
Filed May 19, 1975, Ser. No. 578,584

Claims priority, application Switzerland, May 29, 1974, 7321/74

Int. Cl.² C07D *215/32, 215/34*; A61K *31/47*

U.S. Cl. 424—258 **17 Claims**

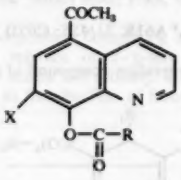
1. A 7,8-disubstituted-5-acetylquinoline of the formula



I

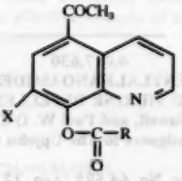
wherein X denotes chlorine, bromine, iodine or nitro, R denotes unsubstituted or halogen-substituted C_1–C_{16} alkyl or C_2–C_{10} alkenyl; C_1–C_4 alkoxy, C_2–C_4 alkenyloxy, C_1–C_4 alkylthio, unsubstituted or methyl-substituted C_5–C_6 cyclohexyl; cyclohexenyl or unsubstituted or nitro, halogen or C_1–C_3 alkyl substituted phenyl.

9. A process for combatting phytopathogenic fungi and bacteria which comprises applying to said fungi and bacteria, an inhibitory amount of a compound of the formula



wherein X denotes chlorine, bromine, iodine or nitro, R denotes unsubstituted or halogen-substituted C_1–C_{16} alkyl or C_2–C_{10} alkenyl; C_1–C_4 alkoxy, C_2–C_4 alkenyloxy, C_1–C_4 alkylthio, unsubstituted or methyl-substituted C_5–C_6 cyclohexyl; cyclohexenyl or unsubstituted or nitro, halogen or C_1–C_3 alkyl substituted phenyl.

12. An antimicrobial composition for combatting phytopathogenic fungi and bacteria which comprises an inert carrier and an inhibitory amount of a compound of the formula



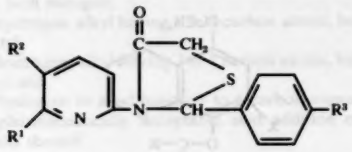
wherein X denotes chlorine, bromine, iodine or nitro, R denotes unsubstituted or halogen-substituted C_1–C_{16} alkyl or C_2–C_{10} alkenyl; C_1–C_4 alkoxy, C_2–C_4 alkenyloxy, C_1–C_4 alkylthio, unsubstituted or methyl-substituted C_5–C_6 cyclohexyl cyclohexenyl or unsubstituted or nitro, halogen or C_1–C_3 alkyl substituted phenyl.

4,017,628
TREATMENT OF MANGE

Ovart Nitidandhaprabhas, 23/1 Tanpuying Pahol Lane, Ngam Vong Varn Road, Bangkhen, Bangkok, Thailand

Filed Dec. 22, 1975, Ser. No. 643,056
Claims priority, application United Kingdom, Dec. 31, 1974, 56173/74
Int. Cl.² A61K *31/44*
U.S. Cl. 424—263 **9 Claims**

1. A method of treating mange in mammals which comprises applying to the infected area a composition comprising:
a. a compound having the formula:



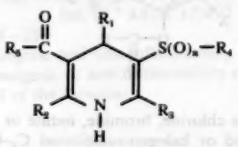
wherein R^1, R^2, and R^3 independently represent substituents selected from the group consisting of hydrogen, halogen, alkyl groups containing 1 to 6 carbon atoms, alkoxy groups containing 1 to 6 carbon atoms, and phenyl; and
b. a physiologically acceptable carrier.

4,017,629
CERTAIN 1,4-DIHYDRO-3-SULFINYL OR SULFONYL-PYRIDINES

Ernst Habicht, Oberwil, and Hans Kühnis, Basel, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed May 28, 1975, Ser. No. 581,523
Claims priority, application Switzerland, June 4, 1974, 7638/74
Int. Cl.² A61K *31/455*; C07D *211/86*
U.S. Cl. 424—266 **15 Claims**

1. A 1,4-dihydropyridine compound of the formula I



(I)

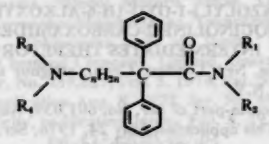
and their tautomers, wherein R_1 is unsubstituted phenyl or phenyl substituted by 1 or 2 identical or different substituents selected from the group consisting of nitro, trifluoromethyl, cyano, azido, lower alkanoyl, sulphamoyl, N-(C_{1-4}) alkylsulphamoyl, N,N-di(C_{1-4})-alkylsulphamoyl, R_2 and R_3 independently of one another represent hydrogen, phenyl, phenyl-(C_{1-4})-alkyl or (C_{1-7})-alkyl, R_4 represents (C_{1-7})-alkyl or unsubstituted phenyl or phenyl substituted by (C_{1-4})-alkyl, (C_{1-4})-alkoxy, halogen or trifluoromethyl, R_5 represents (C1-4)-lower alkoxy, amino, mono- or di-(C_{1-4})-alkylamino, and *n* is 1 or 2.

4,017,630
CERTAIN DIPHENYLALKANOAMIDES USED AS BIRD AND MURINE REPELLENTS

Alan J. Lemin, Plainwell, and Paul W. O'Connell, Kalamazoo, both of Mich., assignors to The Upjohn Company, Kalamazoo, Mich.

Continuation of Ser. No. 64,575, Aug. 17, 1970, abandoned. This application Nov. 29, 1974, Ser. No. 528,216
Int. Cl.³ A01N *9/22*
U.S. Cl. 424—267 **21 Claims**

1. A method of repelling birds and murine pests from prospective available foods which comprises coating the food or mixing with the food an effective amount of a compound of the formula



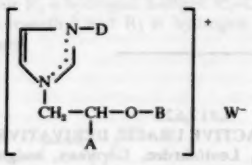
wherein R_1 and R_2 are independently selected from the group consisting of hydrogen and alkyl of one to four carbon atoms, inclusive, *n* is 2 or 3, R_3 and R_4 are independently selected from the group consisting of alkyl of one to four carbon atoms, inclusive, alkenyl of three or four carbon atoms; and R_3 and R_4, when taken together with the nitrogen atom to which they are attached, form a saturated alicyclic ring containing four to six carbon atoms, said alicyclic ring carbons being unsubstituted or substituted with one or more alkyl groups, the total number of carbon atoms in the ring and alkyl substituents being not more than ten, an acid addition salt thereof, a quaternary ammonium salt thereof, an N-oxide thereof or an N-oxide acid addition salt thereof.

4,017,631
IMIDAZOLIUM SALTS

Paul Adriaan Jan Janssen, Vosselaar; Jan Heeres, Turnhout, and Hubert Karel Frans Hermans, Gierle, all of Belgium, assignors to Janssen Pharmaceutica N.V., Beerse, Belgium

Division of Ser. No. 525,142, Nov. 19, 1974, which is a continuation-in-part of Ser. No. 438,810, Jan. 31, 1974, abandoned. This application Mar. 1, 1976, Ser. No. 662,998
Int. Cl.² C07D *233/60*
U.S. Cl. 424—273 **3 Claims**

1. A quaternary imidazolium salt represented by the structure



and hydrates thereof, wherein
A is a member selected from the group consisting of phenyl, mono- di- and trihalophenyl, lower alkyl phenyl, lower alkoxy phenyl, thienyl and halothienyl;
B is a member selected from the group consisting of benzyl, mono- di- and trihalobenzyl, mono- and di-lower alkylbenzyl, lower alkoxybenzyl, cyanobenzyl, phenethyl, mono-, di- and trihalophenethyl, mono- and di-lower alkylphenethyl, lower alkoxyphenethyl, cyanophenethyl, mono- and di-nitrophenyl, mono- and di-aminophenyl, lower alkyl, lower alkenyl and lower alkynyl;
D is an aralkenyl radical represented by the formula

$$-CH_2-CH=CH-Ar^3$$

wherein Ar^3 is selected from the group consisting of phenyl, halophenyl and dihalophenyl; and
W is a pharmaceutically acceptable anion selected from the group consisting of chloride, bromide, iodide, methanesulfonate, p-toluenesulfonate, nitrate, sulfate, phosphate, acetate, propionate, glycolate, lactate, pyruvate, malonate, succinate, maleate, fumarate, malate, tartrate, citrate, benzoate, cinnamate, mandelate, ethanesulfonate, benzenesulfonate, cyclohexanesulfamate, salicylate and p-aminosalicylate.

4,017,632
PHENOXYACETIC ACID DERIVATIVES

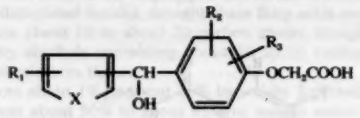
Germaine Thuillier born Nachmias, Paris; Jacqueline Suzanne Laforest born Boutillier du Retail, Vincennes; Bernard Jean Marie Cariou, Combleux; Pierre Alfred Rene Bessin, Chilly Mazarin; Jacqueline Suzanne Bonnet born Roux, and Jean Eugene Thuillier, both of Paris, all of France, assignors to Centre European de Recherches Pharmacologiques C.E.R.P.H.A., Arcueil, France

Filed Oct. 22, 1975, Ser. No. 624,648

Int. Cl.² A61K *31/38, 31/34*

U.S. Cl. 424—275 **7 Claims**

1. A phenoxyacetic acid derivative selected from the group consisting of a phenoxyacetic acid of the general formula



wherein X is oxygen or sulfur and R_1, R_2 and R_3 which may be identical or different, each represents a hydrogen atom, a halogen atom or a C_{1-4} alkyl group, an alkali metal salt thereof and an additional salt thereof with a pharmaceutically acceptable base.

4,017,633
SUBSTITUTED 3-(1-AMINOETHYLIDENE)-5-CINNAMOYL-2H-PYRAN-2,6(3H)-DIONES

Chester Rhodes Willis, Kingston, Jamaica, assignor to Smith-Kline Corporation, Philadelphia, Pa.

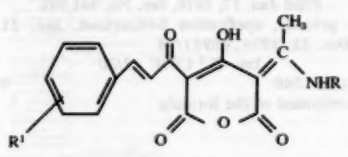
Continuation-in-part of Ser. No. 511,152, Oct. 2, 1974, abandoned. This application Feb. 18, 1976, Ser. No. 658,983

Claims priority, application United Kingdom, Sept. 11, 1975, 37417/75

Int. Cl.² C07D *309/10*

U.S. Cl. 424—283 **12 Claims**

1. A chemical compound of the formula:



wherein:

R is lower alkyl, straight or branched chain, of from 3 to 6 carbon atoms, phenyl, halophenyl, hydroxyphenyl, methoxyphenyl, p-mercaptophenyl or aminophenyl; and

R_1 is hydrogen, hydroxy, methoxy or dimethoxy.

4,017,634
INSECT GROWTH REGULATORS

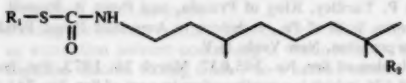
Hsiao-Ling Lam, El Cerrito, and Ferenc M. Pallos, Walnut Creek, both of Calif., assignors to Stauffer Chemical Company, Westport, Conn.

Filed Jan. 12, 1976, Ser. No. 648,061

Int. Cl.² A01N *9/20;* **C07C** *155/02, 155/03*

U.S. Cl. 424—300 **37 Claims**

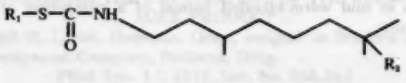
1. A compound having the formula



in which R_1 is lower alkyl, cycloalkyl, or cycloalkyl-alkyl and R_2 is hydrogen or lower alkoxy.

24. An insecticidal composition of matter comprising:

a. an insecticidal amount of a compound having a formula



in which R_1 is lower alkyl, cycloalkyl, or cycloalkyl-alkyl and R_2 is hydrogen or lower alkoxy an inert carrier.

4,017,635
MITICIDAL COMPOSITIONS COMPRISING 2-(P-TERT.-BUTYLPHENOXY)CYCLOHEXYL 2-PROPYNYL SULFITE AND DIBENZYL DISULFIDE

Takeo Ishiguro, Kusatsu, Japan, assignor to Shionogi & Co., Ltd., Osaka, Japan

Filed Mar. 21, 1975, Ser. No. 560,866

Claims priority, application Japan, Mar. 22, 1974, 49-32943

Int. Cl.² A01N *9/02, 9/12, 9/14*

U.S. Cl. 424—303 **2 Claims**

1. A miticidal composition comprising a miticidally effective amount of a mixture of 2-(p-tert.-butylphenoxy)cyclohexyl 2-propynyl sulfite and dibenzyl disulfide in a weight ratio for the sulfite to the disulfide of from 18.8 : 75 to 75 : 18.8.

4,017,636
ESTERS OF γ-GLUTAMYL AMIDE OF DOPAMINE

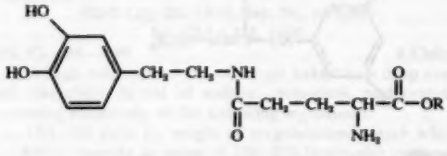
Peter Hadley Jones, Lake Forest; Jaroslav Kyncl, Lake Bluff; Carroll Wayne Ours, Zion, and Pitambar Somani, Libertyville, all of Ill., assignors to Abbott Laboratories, North Chicago, Ill.

Division of Ser. No. 408,901, Oct. 23, 1973, Pat. No. 3,910,988. This application Sept. 24, 1975, Ser. No. 616,346

Int. Cl.² A01N *9/20*

U.S. Cl. 424—309 **4 Claims**

1. A method of increasing renal blood flow of warm-blooded mammals which comprises administering to said mammals at least an effective amount of a renal vasodilator compound of the formula



where R is a straight or branched chain alkyl containing 1 to 18 carbon atoms and a pharmaceutically acceptable acid addition salt thereof.

4,017,637
BENZYLAMINE ANALGESICS

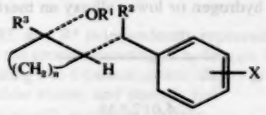
John P. Yardley, King of Prussia, and Peter B. Russell, Villanova, both of Pa., assignors to American Home Products Corporation, New York, N.Y.

Division of Ser. No. 345,037, March 26, 1973, Pat. No. 3,928,626, which is a continuation-in-part of Ser. No. 241,613, April 6, 1972, abandoned. This application Aug. 25, 1975, Ser. No. 607,088

Int. Cl.² A61K *31/135, 31/22, 31/215*

U.S. Cl. 424—311 9 Claims

1. The process for producing analgesia in warm-blooded animals which comprises administering to a warm-blooded animal in need thereof an amount sufficient to produce analgesia in said warm-blooded animal of a compound of the formula:



wherein R^2 is lower alkylamino, N-lower alkyl-N-methylamino, N-phenloweralkyl-N-methylamino, N-lower alkenyl-N-methylamino, N-cycloalkylmethyl-N-methylamino, or N-oxo-N-lower alkyl-N-methylamino; R^3 is hydrogen or methyl; and R^1 is hydrogen, lower alkyl, or lower alkylcarbonyl, and X is loweralkylcarbonyloxy; or R^1 is lower alkylcarbonyl and X is hydrogen, hydroxy, lower alkoxy, lower alkoxymethoxy, or halo; and *n* is an integer of from 3 to 6; and a pharmacologically acceptable acid addition salt thereof.

4,017,638
ISO-(THIO)-UREA DERIVATIVES

Volker Dittrich, Zeiningen; Werner Töpfl, Dornach, and Odd Kristiansen, Möhlin, all of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

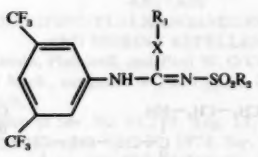
Filed Mar. 3, 1976, Ser. No. 663,413

Claims priority, application Switzerland, Mar. 5, 1975, 2761/75; Feb. 4, 1976, 1359/76

Int. Cl.² C07C *123/00*

U.S. Cl. 424—326 6 Claims

1. An iso-(thio)-urea derivative of the formula



(I)

wherein

R_1 and R_2 each represent C_1–C_5-alkyl or phenyl or benzyl mono-, di- or trisubstituted by halogen, trifluoromethyl, nitro methyl, and

X represents oxygen or sulphur.

4,017,639
2-HYDROXY-3-NITRO-1,4-NAPHTHOQUINONES FOR THE PROPHYLAXIS OF CERTAIN ALLERGIES

Barry Christian Charles Cantello, Horsham; Derek Richard Buckle, Redhill, and Harry Smith, Maplehurst, near Horsham, all of England, assignors to Beecham Group Limited, Great Britain

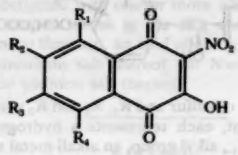
Division of Ser. No. 571,253, April 24, 1975. This application Mar. 12, 1976, Ser. No. 666,260

Claims priority, application United Kingdom, May 28, 1974, 23563/74

Int. Cl.² A61K *31/12*

U.S. Cl. 424—331 34 Claims

1. A pharmaceutical composition in a form suitable for oral, parenteral or insufflation administration to humans which comprises an amount of



(I)

or a pharmaceutically acceptable, nontoxic salt thereof, wherein R_1, R_2, R_3 and R_4 are each hydrogen, lower alkyl, lower alkoxy, phenyl, hydroxy or halogen, or any adjacent two of R_1, R_2, R_3 and R_4 taken together with the carbon atoms to which they are joined form a 5- or 6-membered carbocyclic ring, provided that R_1, R_2, R_3 and R_4 are not all hydrogen, sufficient to be effective for the prophylaxis of asthma, hayfever or rhinitis, in combination with a pharmaceutically acceptable nontoxic carrier suitable for said administration form.

4,017,640
1-p-ALKYLPHENYL-1-p-(ALKOXYPHENYL)-2-NITROALKANES

Beat Böhner, Binningen; Dag Dawes, Muttenz, and Willy Meyer, Riehen, all of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

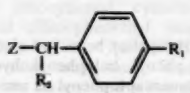
Filed Jan. 17, 1975, Ser. No. 541,982

Claims priority, application Switzerland, Jan. 21, 1974, 786/74; Dec. 21, 1974, 15951/74

Int. Cl.² C07C *43/20*

U.S. Cl. 424—340 9 Claims

1. A compound of the formula

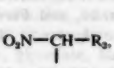


wherein

R_1 represents C_1–C_3-alkyl,

R_2 represents p-(C_1 or C_2)-alkoxyphenyl,

Z represents



and

R_3 represents C_3–C_5-alkyl.

4,017,641
SKIN MOISTURIZING COMPOSITIONS CONTAINING 2-PYRROLIDINONE

David Neil DiGiulio, Springfield Township, Hamilton County, Ohio, assignor to The Procter & Gamble Company, Cincinnati, Ohio

Filed Jan. 31, 1975, Ser. No. 545,938
Int. Cl.² A61K 7/48
U.S. Cl. 424—365 6 Claims

1. A skin conditioning composition in the form of an oil-in-water emulsion comprising:

A from about 1% to about 25% by weight of an oil component which is physiologically acceptable for placement on the skin, and in which 2-pyrrolidinone is freely miscible when said oil component is in the liquid state; said oil component being selected from the group consisting of lanolin fatty acids, isopropyl esters of lanolin fatty acids, hydroxylated lanolin, straight chain fatty acids containing from about 10 to about 20 carbon atoms, straight chain fatty alcohols containing about 10 to 20 carbon atoms and mixtures thereof;

B. from about 1% to about 20% by weight 2-pyrrolidinone;

C. from about 50% to about 95% by weight water; and

D. an amount of oil-miscible emulsifier sufficient to achieve an emulsion between components A, B and C; said composition being prepared by a process comprising the steps of

1. liquifying the oil component by bringing it to a temperature at which it is liquid;

2. mixing the emulsifier and from about 10% to about 95% by weight of the total amount of 2-pyrrolidinone to be used in said composition into said oil component;

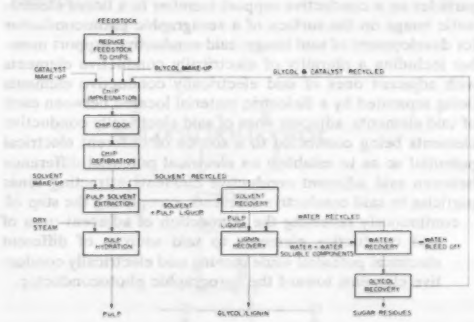
3. dissolving the balance of the 2-pyrrolidinone into the water; and

4. mixing the water solution of step (3) into the mixture of step (2) to form an emulsion.

4,017,642
PROCESS OF MAKING FOOD FOR RUMINANT ANIMALS FROM WOOD AND/OR WOODY PRODUCTS

George O. Orth, Jr., and Richard D. Orth, both of Seattle, Wash., assignors to George O. Orth, Seattle, Wash.

Filed July 28, 1975, Ser. No. 599,634
Int. Cl.² A23K 1/12
U.S. Cl. 426—69 16 Claims



1. A method of making a food for ruminant animals which is substantially free from substances which are inimical to the microflora contained in the rumen of ruminant animals, comprising:

comminuting wood and/or woody material

impregnating the comminuted material with a solvent mixture consisting essentially of an acid catalyst and a glycol or glycol-ether solvent having from 2 to 6 carbon atoms,

heating the material impregnated with the solvent mixture to a temperature of at least 145° C. for a time sufficient to delignify the wood at least 70% and solubilize the lignin and wood sugars contained in the material,

subjecting the treated material to defibration to form a defibrated cellulose pulp,

extracting the solvent mixture from the defibrated pulp with an extraction solvent containing a water-soluble, lower aliphatic alcohol having from 1 to 4 carbon atoms,

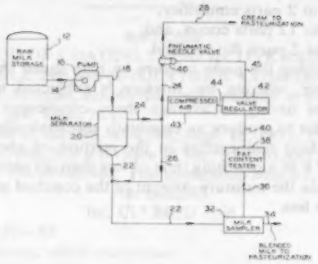
recovering the solvent extracted pulp substantially in the anhydrous state, and

rehydrating the substantially anhydrous pulp for feeding to ruminant animals.

4,017,643
PROCESS FOR STANDARDIZING MILK BY MONITORING THE FAT CONTENT OF THE BLENDED MILK PRODUCT

Joseph H. Lester, Gresham, Oreg., assignor to Western Food Equipment Company, Portland, Oreg.

Filed Apr. 17, 1975, Ser. No. 568,865
Int. Cl.² A23C 7/00
U.S. Cl. 426—231 4 Claims



1. A process for producing a blended milk product having a predetermined fat content from raw milk, which comprises the steps of:

a. continuously introducing a stream of said raw milk into a milk separation zone and separating said raw milk stream to provide a skimmed milk fraction and a cream fraction;

b. continuously and separately withdrawing said skimmed milk fraction and said cream fraction from said separation zone;

c. continuously splitting said cream fraction into a first portion and a second portion and removing said first portion from the process;

d. continuously admixing said second portion with said skimmed milk fraction to provide a blended milk stream;

e. continuously testing said blended milk stream to determine the fat content thereof;

f. continuously comparing the fat content of said blended milk stream with said predetermined fat content; and

g. continuously controlling the amount of said second portion of cream to provide said blended milk product.

4,017,644
HIGH CALORIE FOOD BAR

Louis Jokay, Niles, Ill., assignor to G. D. Searle & Co., Chicago, Ill.

Filed Aug. 25, 1975, Ser. No. 607,435
Int. Cl.² A23L 1/10
U.S. Cl. 426—540 4 Claims

1. A high calorie food bar of dough baked to a crisp crust and essentially devoid of sodium, potassium, and protein, consisting essentially of the following ingredients:

a. 150–250 parts by weight of pregelatinized starch which has a viscosity in water of 250–500 Brabender units,

b. 300–500 parts by weight of edible vegetable oil which is semiplastic at 50°–70° F and liquid above 80° F,

c. 200–400 parts by weight sugar, and

d. consumable coloring and flavoring.

4,017,645

FAST CONCHED CANDY COATING AND METHOD

Salvatore F. Ziccarelli, Downers Groove, Ill., assignor to Beatrice Foods Co., Chicago, Ill.

Continuation-in-part of Ser. No. 628,559, Nov. 3, 1975, Pat. No. 3,976,806. This application Aug. 23, 1976, Ser. No. 716,794

Int. Cl.² A23G *1/16, 1/00*

U.S. Cl. 426—613 15 Claims

1. A process for producing a candy coating comprising:

1. providing a mixture in a paste form having the following ingredients:
   a. 30 to 65 parts fat,
   b. 40 to 70 parts sugar,
   c. 0 to 8 parts milk and/or whey solids,
   d. 0 to 2 parts emulsifier,
   e. 0 to 12 parts cocoa, and
   f. 0 to 2 parts flavors; and
2. conching the paste mixture by high speed shearing and mixing, wherein the mixture is subjected to shearing forces having an average shear component of 75° or greater to produce an essentially mechanically generated conching temperature in the mixture of about 150° to 250° F in a conching time of less than 20 seconds and to reduce the moisture content of the conched mixture to 5 % or less.

4,017,646

PROCESS FOR PRODUCING PH MODIFIED PROTEIN FILAMENTS

Ralph A. Hoer, Ballwin, Mo., and Michael H. Stewart, Belleville, Ill., assignors to Ralston Purina Company, St. Louis, Mo.

Filed Dec. 11, 1975, Ser. No. 639,721

Int. Cl.² A23J *3/00*

U.S. Cl. 426—656 17 Claims

1. In a method of continuously forming discrete, elongated protein filaments from proteinaceous material wherein an aqueous slurry of the proteinaceous material is formed having a pH below about 6.0 and a proteinaceous solids content of between about 0.5 and 35% by weight, the discrete, elongated filaments being formed by continuously conducting the slurry under pressure through a heat exchange zone and in said zone heating the slurry to a temperature which is above 240° F. but which is less than that which will degrade the protein, whereby the protein is subjected to such temperature for a sufficient period of time so that elongated, tender filaments are thereafter separated from the remaining constituents of the slurry and the heated slurry is continuously removed from said zone through a back pressure creating orifice whereby the discharge of said filaments from the heat exchange zone to a collecting zone is controlled by confining the stream of said filaments being discharged from said orifice into collecting zone to within a total angle of between about 4° and 90°, said angle being measured from an axis through the center of said orifice, followed by separation of said discrete filaments in the collecting zone from the remaining constituents of the slurry, the improvement comprising; injecting a pH elevating material into the stream of filaments during confinement in order to modify the pH of the filaments to above about 6.0.

4,017,647

METHOD FOR PROVIDING ENTERIC COATINGS ON SOLID DOSAGE FORMS

Shigeru Ohno, Kamakura; Noboru Hoshi, Higashikurune, and Fujio Sekigawa, Yono, all of Japan, assignors to Shin-Etsu Chemical Company Limited, Tokyo, Japan

Filed June 9, 1975, Ser. No. 584,914

Claims priority, application Japan, June 11, 1974, 49-66271

Int. Cl.² A61K *9/00, 15/00, 21/00*

U.S. Cl. 427—3 13 Claims

1. A method for providing an enteric coating on a solid pharmaceutical dosage form which comprises coating said dosage form with an aqueous solution of a polymeric substance having carboxyl groups in the form of a water-soluble salt selected from the group consisting of alkali metal, ammonium and amine salts of said polymeric substance said coating being carried out in the absence of an organic solvent and bringing the coated dosage form into contact with a strong inorganic acid so that said polymeric substance is converted into a water-insoluble acid form, the amount of said acid being equal to or greater than the equivalent amount of said salt.

4,017,648

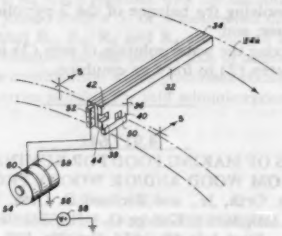
TONER AGITATION THROUGH MICROFIELD DONOR

Ernest A. H. Weiler, Rochester, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Division of Ser. No. 546,589, Feb. 3, 1975. This application May 24, 1976, Ser. No. 689,281

Int. Cl.² B05D *1/06*

U.S. Cl. 427—14 4 Claims



4. A Method of transporting triboelectrically charged toner particles on a conductive support member to a latent electrostatic image on the surface of a xerographic photoconductor for development of said image, said conductive support member including a plurality of electrically conductive elements with adjacent ones of said electrically conductive elements being separated by a dielectric material located between each of said elements, adjacent ones of said electrically conductive elements being connected to a source of different electrical potential so as to establish an electrical potential difference between said adjacent conductive elements attracting toner particles to said conductive elements, comprising the step of:

continuously reversing the connection of adjacent ones of said conductive elements to said sources of different electrical potential while moving said electrically conductive elements toward the xerographic photoconductor.

4,017,649

RADIATION-SENSITIVE COMPOUNDS AND METHODS OF USING SAME

Robert DeMajistre, Pittsburgh, Pa., assignor to PPG Industries, Inc., Pittsburgh, Pa.

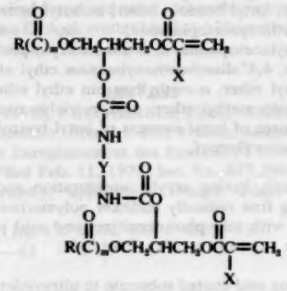
Division of Ser. No. 329,914, Feb. 5, 1973, which is a continuation-in-part of Ser. No. 171,321, Aug. 12, 1971, abandoned. This application Dec. 11, 1975, Ser. No. 639,722

Int. Cl.² B05D *3/06;* C07C *125/06*

U.S. Cl. 427—44 21 Claims

1. A mixture comprising

a. at least one compound containing urethane linkages and represented by the general formula:



wherein

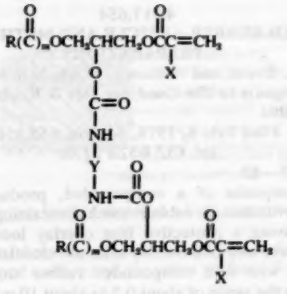
1. R is selected from the group consisting of n-octyl, isooctyl, 2-ethylhexyl, decyl, dodecyl, tetradecyl eicosyl and tertiary alkyl of the formula

wherein R_1, R_2 and R_3 are alkyl groups containing 1 to 5 carbon atoms;

2. Y is a divalent hydrocarbon radical containing from 6 to 16 carbon atoms;
3. X is hydrogen or methyl; and
4. *m* is 0 or 1; and

b. at least one other radiation sensitive monomer.

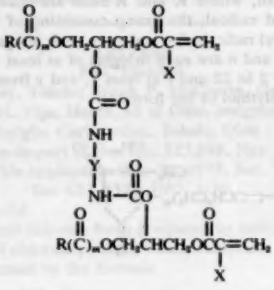
8. A method of obtaining a hard, stain-resistant material comprising subjecting to ionizing irradiation a compound containing urethane linkages and represented by the general formula



wherein R is a saturated alkyl radical, Y is a divalent hydrocarbon having from 6 to 16 carbon atoms, X is hydro or methyl and *m* is 0 or 1.

16. A method of coating a substrate comprising

a. applying to a substrate a coating of a compound containing urethane linkages and represented by the general formula:



wherein R is a saturated alkyl radical, Y is a divalent hydrocarbon having from 6 to 16 carbon atoms, X is hydro or methyl and *m* is 0 or 1; and

b. subjecting said coating to ionizing irradiation to form a hard, mar-resistant and stain-resistant film.

4,017,650

METHOD OF COATING USING ACTIVE RADIATION CURABLE POLYENE-POLYTHIOL COMPOSITIONS

Charles R. Morgan, Brookeville, Md., assignor to W. R. Grace & Co., New York, N.Y.

Division of Ser. No. 614,580, Sept. 18, 1975, Pat. No. 3,984,297, which is a division of Ser. No. 461,207, April 15, 1974, Pat. No. 3,945,982. This application May 21, 1976, Ser. No. 688,643

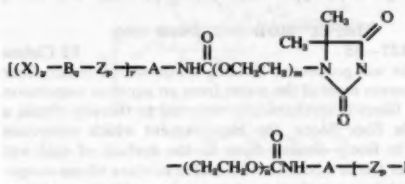
Int. Cl.² B05D *3/06*

U.S. Cl. 427—53 **3 Claims**

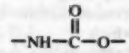
1. A process which comprises:

A. applying to the surface of a substrate a layer of a composition consisting essentially of:

1 A polyene of the formula:



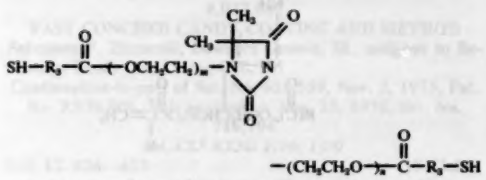
wherein A and B are polyvalent organic radical members free of reactive carbon to carbon unsaturation and are independtly selected from the group consisting of aryl, substituted aryl, aralkyl, substituted aralkyl, cycloalkyl, substituted cycloaklyl, alkyl and substituted alkyl containing 1 to 36 carbon atoms and mixtures thereof, said group members can be connected by a chemically compatible linkage selected from the group consisting of —0—, —S—, carboxylate, carbonate, carbonyl, urethane and substituted urethane, urea and substituted urea, amide and substituted amide, amine and substituted amine and hydrocarbon; Z is a divalent chemically compatible linkage selected from the group consisting of



—O— and —S—; X is a member selected from the group consisting of (a) $-(CH_2)_d-CR'=CHR$, (b) $-O-(CH_2)_d-CR'=CHR$, (c) $-S-(CH_2)-_{CR'}\lambda_{CR'=CHR}$, (d) $-_{(CH_2)}-_d-C \equiv CR$, (e) —O—(CH₂-

$)_d$—C ≡ CR, (f) —S—$(CH_2)_d$—C ≡ CR; and mixtures thereof; where R and R'each are independently selected radical; the group consisting of hydrogen and methyl radicals *d*, *p* and *q* are each integers from 0 0 to 1; *m* and *n* are each integers of at least 1; with *m* + *n* from 2 to 22 and *r* at least 1, and *y* from 1 to 10; and

2. A polythiol of the formula:



wherein *m* and *n* are each at least 1 and *m* + *n* is 2 to 22 and R_3 is a polyvalent organic radical member free of reactive carbon-to-carbon unsaturation and is selected from the group consisting of aryl; substituted aryl, aralkyl, substituted aralkyl, cylcoalkyl, substituted cycloalkyl, alkyl and substituted alkyl groups containing 1 to 16 carbon atoms and mixtures thereof, the total combined functionality of (a) the reactive carbon to carbon bonds per molecule in the polyene and (b) the thiol groups per molecule in the polythiol being greater than 4 and

3. a photocuring rate accelerator and, thereafter, exposing the layer to actinic radiation thereby curing said composition.

4,017,651

PRE-TREATMENT OF NON-WOVENS

Gustav Sinn, Opladen, and Martin Matner, Odenthal, both of Germany, assignors to Bayer Aktiengesellschaft, Germany

Filed Mar. 25, 1975, Ser. No. 561,936

Claims priority, application Germany, Mar. 30, 1974, 2415602

Int. Cl.² B05D *3/02*; **D06B** *1/00*

U.S. Cl. 427—55 **12 Claims**

1. In the wet process of forming a non-woven textile fiber fleece wherein most of the water from an aqueous suspension of textile fibers is mechanically removed to thereby obtain a wet textile fiber fleece, the improvement which comprises applying in finely divided form to the surface of said wet textile fiber fleece a heat-sensitive latex mixture whose coagulation point does not change substantially on dilution and then heating the fleece to a temperature at which the latex mixture coagulates to form a gel-like film.

4,017,652

PHOTOCATALYST SYSTEM AND ULTRAVIOLET LIGHT CURABLE COATING COMPOSITIONS CONTAINING THE SAME

Gerald W. Gruber, Sewickley, Pa., assignor to PPG Industries, Inc., Pittsburgh, Pa.

Filed Oct. 23, 1974, Ser. No. 517,572

Int. Cl.² B05D *3/06*

U.S. Cl. 427—54 **20 Claims**

13. A method comprising:

a. coating a substrate with an ultraviolet light curable coating composition comprising

1. at least one aromatic ketone or aromatic aldehyde photosensitizer which

a. has a triplet energy in the range of from about 54 kilocalories per mole to about 72 kilocalories per mole, and

b. promotes polymerization through bimolecular photochemical reactions of the energy donor type,

2. at least one aromatic ketone photoinitiator which generates a radical pair by way of unimolecular homolysis resulting from photoexcitation, at least one member of said radical pair being capable of initiating addition polymerization of acrylic groups, said aromatic ketone photoinitiator being selected from the group consisting of ethyl benzoin ether, isopropyl benzoin ether, butyl benzoin ether, isobutyl benzoin ether, α, α-diethoxyacetophenone, α, α-diethoxy-α-phenylacetophone, α, α-dimethoxy-α-phenylacetophenone, 4,4'-dicarboethoxybenzoin ethyl ether, benzoin phenyl ether, α-methylbenzoin ethyl ether, α-methylbenzoin methyl ether, α, α, α-trichloroacetophenone, mixtures of butyl isomers of butyl benzoin ether, and mixtures thereof,

and

3. a resin having acrylic unsaturation and capable of being free radically addition polymerized by interaction with said photosensitizer and said photoinitiator upon exposure to ultraviolet light;

and

b. exposing said coated substrate to ultraviolet light to cure said coating into a hard mar and abrasion resistant film.

4,017,653

ABSORBENT ARTICLES AND METHODS FOR THEIR PREPARATION

James R. Gross, Lake Jackson, Tex., assignor to The Dow Chemical Company, Midland, Mich.

Division of Ser. No. 468,794, May 9, 1974, Pat. No. 3,980,663, which is a continuation-in-part of Ser. No. 371,909, June 20, 1973, abandoned. This application May 1, 1975, Ser. No. 573,661

Int. Cl.² B05D *3/02*; **C08L** *31/02*, *33/02*

U.S. Cl. 427—385 A **15 Claims**

1. A method of preparing an absorbent article coated with a substantially dry water swellable polyelectrolyte which comprises

a. applying a coating on a relatively thin article wherein the coating comprises

1. a solution of a carboxylic synthetic polyelectrolyte wherein the solution consists of water, lower alcohols, or mixtures thereof and about 5 to about 60% by weight of a carboxylic polyelectrolyte, and

2. at least about 0.1% by weight based on the polyelectrolyte of a crosslinking agent reactive with carboxylate groups,

B. heating said coated article to a temperature greater than about 30° C. to crosslink said polyelectrolyte.

4,017,654

CURED RUBBER ARTICLE AND METHOD OF PREPARATION

Theodore A. Evans, and William A. Watts, both of Uniontown, Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Feb. 6, 1976, Ser. No. 655,818

Int. Cl.² B32B *31/00*

U.S. Cl. 428—40 **11 Claims**

1. A composite of a compounded, productive, tacky, shaped, unvulcanized rubber stock containing a curative therefor having a protective film overlay loosely adhered thereto, where said film overlay is an unvulcanized composite compatible with said compounded rubber stock having a thickness in the range of about 0.5 to about 10 mils comprised of an unvulcanized thermoelastic block copolymer selected from the group consisting of ABA and ABC block copolymers in which A represents a non-elastomeric monovinyl aromatic hydrocarbon polymer block selected from at least one of styrene, alpha methyl styrene and vinyl toluene having an average molecular weight in the range of about 7,000 to about 25,000 and a glass transition temperature above about 25° C., the total block A content being about 20 to about 70 weight

percent of the ABA copolymer, B is an elastomeric conjugated diene polymer block selected from at least one of 1,3-butadiene, isoprene and piperylene having an average molecular weight of about 30,000 to about 100,000 and a glass transition temperature below about 10° C., and C is a polar polymer block derived from vinyl pyridine, vinyl quinoline, acrylic, vinyl nitrile, vinyl furan and vinyl carbazole monomers, where the total A plus C block content is about 20 to about 70 weight percent of the total ABC copolymer.

4,017,655

SELECTIVELY SEPARABLE STRIP ASSEMBLY

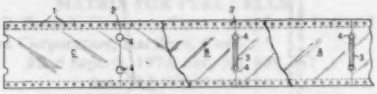
Ulrich F. Mutschler, Marly-le-Roi, France, assignor to I E R Impression Enregistrement des Resultats, France

Filed Feb. 11, 1976, Ser. No. 657,206

Claims priority, application France, Mar. 26, 1975, 75.09535

Int. Cl.² B65D *65/28*; G09F *3/00*

U.S. Cl. 428—43 **5 Claims**



1. A strip assembly for imprinting of data and for subsequent selective separating comprising

an elongated support strip; and

a second strip superimposed on said support strip, said second strip being substantially coextensive with said support strip and having

means defining a plurality of transverse slits extending partially across said second strip at substantially equal longitudinal intervals,

said assembly being severable along transverse lines aligned with and transversely offset from said slits to completely separate said second strip into individual sheets while leaving corresponding portions of said support strip interconnected at the regions adjacent said slits.

4,017,656

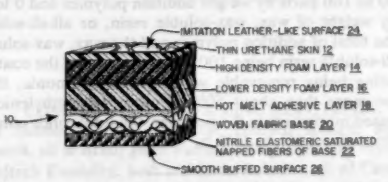
IMITATION LEATHER MATERIAL AND METHOD OF PREPARING SUCH MATERIAL

Henry R. Lasman, Andover, Mass.; Robert J. Lebenson, Nashua, N.H., and Reuben Wisotzky, Lexington, Mass., assignors to Pandel-Bradford, Inc., Lowell, Mass.

Filed Sept. 18, 1975, Ser. No. 614,362

Int. Cl.² B32B *27/40*

U.S. Cl. 428—86 **33 Claims**


IMITATION LEATHER-LIKE SURFACE 24
THIN URETHANE SKIN 12
HIGH DENSITY FOAM LAYER 14
LOWER DENSITY FOAM LAYER 16
HOT MELT ADHESIVE LAYER 18
WOVEN FABRIC BASE 20
NITRILE ELASTOMERIC SATURATED NAPPED FIBERS OF BASE 22
SMOOTH BUFFED SURFACE 26
10

1. An imitation leather material which comprises in combination:

a. a woven fabric base sheet material, one surface of which is a napped surface and the other surface of which is not napped;

b. the napped surface of the base sheet impregnated with a cross-linked polymeric material;

c. the napped impregnated surface of the base sheet characterized by a buffed, flesh-like surface;

d. an open-cell flexible polymeric foam layer bonded to the other unnapped surface of the base sheet material;

e. a thin polymeric skin layer bonded to the surface of the foam layer; and

f. the thin polymeric skin layer characterized by an imitation leather-like surface.

4,017,657

PVC FOAMS

Kevin M. Foley, Toledo; Frank P. McCombs, Granville, and Francesco M. Vigo, Heath, all of Ohio, assignors to Owens-Corning Fiberglas Corporation, Toledo, Ohio

Continuation-in-part of Ser. No. 523,596, Nov. 14, 1974, abandoned. This application Oct. 20, 1975, Ser. No. 624,145

Int. Cl.² B32B *3/02, 3/26*

U.S. Cl. 428—95 **6 Claims**

1. A polyvinyl chloride foam produced by curing and blowing a polyvinyl chloride plastisol which comprises a long chain silane represented by the formula

$$(R-O-CH_2-\underset{\displaystyle X}{\underset{|}{CH}}-CH_2-O+_{n}Si\,X_{4-n}$$

wherein R is an alkyl radical having from 5 to 50 carbon atoms, *n* has a value within the range from 1 to 4 and X represents chlorine, bromine, fluorine or iodine.

4,017,658

COMPOSITE TEXTURED PRODUCTS AND THEIR MANUFACTURE

René F. Bomboire, Wiltz, Luxembourg, assignor to Eurofloor S.A., Luxembourg

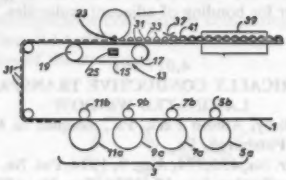
Filed Mar. 5, 1974, Ser. No. 448,451

Claims priority, application Luxembourg, Nov. 21, 1973, 68838

The portion of the term of this patent subsequent to Sept. 16, 1992, has been disclaimed.

Int. Cl.² B32B *3/14*; B05D *1/36*; B32B *31/26*

U.S. Cl. 428—172 **20 Claims**



1. A process for the manufacture of sheet material having a relief effect on at least a first surface comprising the steps of:

printing a decoration on a surface of a support member;

applying at least one discontinuous layer of a transparent plastisol over and in registration with at least part of the printed decoration, the plastisol being applied in a thickness of at least ten mils and imparting a desired relief appearance to the printed decoration, the decoration being viewed through the discontinuous layer of plastisol; and

passing the printed plastisol bearing support through a gelation oven.

4,017,659

TEAM LATTICE FIBERS

George C. Brumlik, Montclair, N.J., assignor to Ingrip Fasteners Inc., Montclair, N.J.

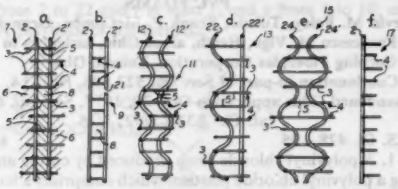
Filed Oct. 17, 1974, Ser. No. 515,792

Int. Cl.² B32B *9/00*; D02G *3/00*

U.S. Cl. 428—397 **3 Claims**

1. A composite textile filament comprising at least two synthetic or natural textile filaments selected from the group consisting of polyesters, polyamides, polyimides, rayon, ace-

tate, rayon triacetate, cellulose, acrylics, polyolefins, polyvinyl derivatives, protein-based polymers, glass, cotton, flax, ramie, wool and animal hair extending side by side in the axial direction, said filaments being joined by a series of individual transverse textile fibers selected from the group consisting of textile fines, cotton linters and silk rod which join said filaments extending side by side in the axial direction into said composite filament.



4,017,660

DIELECTRIC MATERIAL HAVING MONOMOLECULAR LAYERS AND CAPACITORS IN WHICH SAID MATERIAL IS EMPLOYED

André Barraud, Bures sur Yvette, and Jean Messier, Gif sur Yvette, both of France, assignors to Commissariat a l'Energie Atomique, Paris, France

Filed Sept. 29, 1975, Ser. No. 617,724

Claims priority, application France, Oct. 8, 1974, 74.33850

Int. Cl.² B32B 9/04

U.S. Cl. 428—411 **9 Claims**

1. A dielectric material of the type having monomolecular layers of an organic substance consisting of: molecules formed of a long aliphatic chain of formula $CH_3—(CH_2)_n$ wherein n is within the range of 18 to 30, and terminating in a hydrophilic group; and means for cohering said molecules including a plurality of lateral groups each grafted onto each of said aliphatic molecules, whereby pairs of said lateral groups cooperate together for bonding of adjacent molecules.

4,017,661

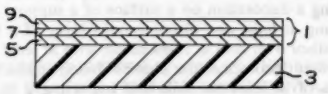
ELECTRICALLY CONDUCTIVE TRANSPARENT LAMINATED WINDOW

Frank H. Gillery, Allison Park, Pa., assignor to PPG Industries, Inc., Pittsburgh, Pa.

Division of Ser. No. 495,974, Aug. 9, 1974, Pat. No. 3,962,488. This application Jan. 19, 1976, Ser. No. 650,400

Int. Cl.² B32B 27/36

U.S. Cl. 428—412 **11 Claims**



1. A transparent, colorless article comprising in combination:

a. a transparent substrate,

b. a first transparent layer having a thickness of from 200 to 500 Angstroms affixed to said substrate deposited as TiO_x, where x is a value greater than 1.3 but less than 1.7,

c. a second transparent layer of metal selected from the class consisting of silver and gold having a thickness of from 60 to 250 Angstroms overlying and affixed to said first transparent layer, and having a sheet resistance of less than 10 ohms per square,

d. a third transparent layer having a thickness of from 200 to 500 Angstroms overlying and affixed to said second transparent layer deposited as TiO_x, where x is a value greater than 1.3 but less than 1.7; said coated article having a luminous transmittance of at least 80 percent.

4,017,662

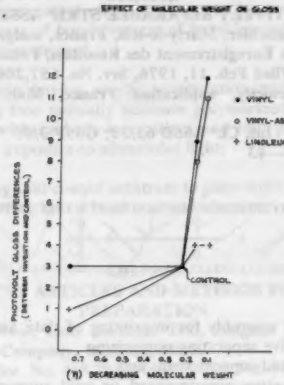
POLISHING METHOD

David R. Gehman, Harleysville, Pa., and Irwin S. Fiarman, Willingboro, N.J., assignors to Rohm and Haas Company, Philadelphia, Pa.

Continuation-in-part of Ser. No. 686,709, Nov. 29, 1967, abandoned, and Ser. No. 771,703, Oct. 30, 1968, abandoned. This application Jan. 24, 1972, Ser. No. 220,394

Int. Cl.² B05D 3/02; B32B 19/04, 9/04, 27/08

U.S. Cl. 428—443 **16 Claims**



1. A method of polishing wood, linoleum, asphalt, vinyl, and vinyl asbestos flooring, with a high gloss coating having a Knoop hardness number of at least 0.5. comprising the steps of applying thereto a layer of a polymeric composition having an essentially water-clear appearance and containing alkaline or buffering agents, a salt of a water-insoluble addition polymer having carboxyl groups, a surface active agent, water, and optional ingredients, in which said addition polymer consists essentially of an addition polymer of monomers consisting essentially of from 12% of about 25% by weight of an α,β-unsaturated carboxylic acid interpolymerized with an ester of acrylic acid or methacrylic acid, which polymer contains no more than about 10% of an additional copolymerizable hydrophilic property-conferring mononer having hydroxyl, amide, or amine groups, said polymer having an intrinsic viscosity, at 30° C. in tetrahydrofuran, of between 0.05 and 0.15, and in which a water miscible coalescing agent or plasticizer is present in an amount between about 3% and 75%, based on the combined weights of the acrylic polymer, and any wax, wax-soluble polymer, or alkali-soluble polymer present, there being 30 to 100 parts by weight addition polymer and 0 to 70 parts by weight of wax, wax-soluble resin, or alkali-soluble resin, the total of addition polymer and the wax, wax-soluble, or alkali-soluble resin being 100 parts, and drying the coating, the coating being removable with aqueous ammonia, there being no more than about 50% of other monoethylenically unsaturated monomers in the polymer, the total solids content being from about 8% to 45% by weight.

4,017,663

ELECTRODES FOR ELECTROCHEMICAL CELLS

Richard D. Breault, Coventry, Conn., assignor to United Technologies Corporation, Hartford, Conn.

Continuation-in-part of Ser. No. 443,057, Feb. 15, 1974, abandoned, which is a continuation of Ser. No. 268,258, July 3, 1972, abandoned, which is a continuation-in-part of Ser. No. 98,934, Dec. 16, 1970, abandoned. This application Apr. 4, 1975, Ser. No. 565,177

Int. Cl.² H01M 8/00

U.S. Cl. 429—12 **9 Claims**

1. In a fuel cell comprising an anode electrode, a cathode electrode, spaced apart and forming an electrolyte compart-

ment therebetween, and means constructed and arranged to define a reactant gas passage on the nonelectrolyte side of each electrode, an improvement to said cell wherein at least one of said electrodes includes a carbon paper substrate comprising carbon fibers each coated with pyrolytic carbon, said pyrolytic carbon forming electrically conductive bonds between said fibers, said substrate including a hydrophobic polymer dispersed therein for wet-proofing the substrate, and a layer disposed on said wet-proofed substrate consisting of a catalyst and a hydrophobic polymer.

4,017,664

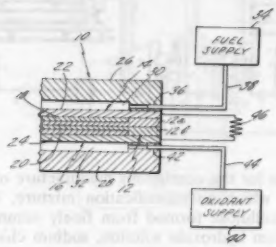
SILICON CARBIDE ELECTROLYTE RETAINING MATRIX FOR FUEL CELLS

Richard D. Breault, Coventry, Conn., assignor to United Technologies Corporation, Hartford, Conn.

Filed Sept. 2, 1975, Ser. No. 609,867

Int. Cl.² H01M 8/02

U.S. Cl. 429—44 **24 Claims**



1. A fuel cell comprising:
a pair of spaced apart gas diffusion electrodes;
a porous electrolyte retaining matrix confined in the space between said electrodes and extending therebetween, and comprising at least 90% silicon carbide; and
phosphoric acid electrolyte disposed within said matrix.

4,017,665

COMPOSITION FOR A ZINC ELECTRODE

Josef Sandera; Milan Calabek; Oldrich Kouril; Miroslav Cenek, all of Brno; Josef Vanacek, Slapanice; Jiri Malik, and Vojtech Koudelka, both of Mlada Boleslav, all of Czechoslovakia, assignors to Prazska akumulatorka, narodni podnik, Mlada Boleslav, Czechoslovakia

Filed May 21, 1975, Ser. No. 579,701

Claims priority, application CanalZone, May 21, 1974, 3620/74

Int. Cl.² H01M 35/02

U.S. Cl. 429—229 **5 Claims**

1. An improved composition for a zinc electrode, consisting of (a) a powdered material selected from the group consisting of zinc and zinc compounds, (b) a binding agent, (c) a porosity-increasing agent, and (d) a substance selected from the group consisting of sodium fluoride, potassium fluoride, and their mixtures, the substance being present in the composition in the range of 5–55% by weight.

4,017,666

PHOTODEGRADABLE POLYOLEFINS CONTAINING AN HALOALKYL DISULFIDE

Bernard Freedman, Berkeley, and Martin J. Diamond, Oakland, both of Calif., assignors to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.

Division of Ser. No. 603,080, Aug. 8, 1975, Pat. No. 3,968,096, which is a division of Ser. No. 543,706, Jan. 23, 1975, Pat. No. 3,929,723. This application Apr. 21, 1976, Ser. No. 678,830

Int. Cl.² C08J 3/20

U.S. Cl. 526—3 **2 Claims**

1. A photodegradable composition comprising a polyolefin and about from 0.1 to 10%, based on the weight of polyolefin, of an additive of the structure

$$R-(CH_bX_a)_c-S-S-(CH_bX_a)_c-R$$

wherein:
each X is chlorine, bromine, or iodine
R is hydrogen, chlorine, bromine, iodine, or an alkyl radical containing 1 to 6 carbon atoms
a is 1 or 2
b is 2-*a*
c is 1 or 2.

4,017,667

PHOTODEGRADABLE POLYOLEFIN COMPOSITION CONTAINING AN N-HALO BENZENESULPHONAMIDE

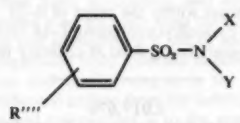
Bernard Freedman, Berkeley, and Martin J. Diamond, Oakland, both of Calif., assignors to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.

Division of Ser. No. 582,507, May 30, 1975, Pat. No. 3,968,095, which is a division of Ser. No. 453,911, March 22, 1974, Pat. No. 3,932,352. This application Apr. 2, 1976, Ser. No. 672,907

Int. Cl.² C08J 3/20

U.S. Cl. 526—3 **2 Claims**

1. A photodegradable composition comprising a polyolefin and about from 0.1 to 10%, based on the weight of polyolefin, of an additive of the structure —



wherein X is chlorine, bromine, or iodine, Y is hydrogen, chlorine, bromine, or iodine, and R'''' is hydrogen, a lower alkyl radical, chlorine, bromine, or iodine.

4,017,668

PHOTODEGRADABLE POLYOLEFIN COMPOSITION CONTAINING AN HALOGENATED ISOCYANURIC ACID

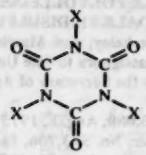
Bernard Freedman, Berkeley, and Martin J. Diamond, Oakland, both of Calif., assignors to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.

Division of Ser. No. 582,507, May 30, 1975, Pat. No. 3,968,095, which is a division of Ser. No. 453,911, March 22, 1974, Pat. No. 3,932,352. This application Apr. 2, 1976, Ser. No. 672,904

Int. Cl.² C08J 3/20

U.S. Cl. 526—6 **2 Claims**

1. A photodegradable composition comprising a polyolefin, and about from 0.1 to 10%, based on the weight of polyolefin, of an additive of the structure -



wherein X is chlorine, bromine, or iodine.

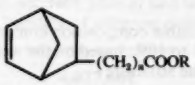
4,017,669

FUNCTIONALLY SUBSTITUTED TERPOLYMERS AND TETRAPOLYMERS OF ALPHA-OLEFINS AND PROCESS FOR MANUFACTURING FUNCTIONAL SUBSTITUTED COPOLYMERS

John Wilfred Collette; Rolland Shin-Yuan Ro, and Fred Max Sonnenberg, all of Wilmington, Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Division of Ser. No. 829,758, June 2, 1969, Pat. No. 3,748,316.
This application Apr. 27, 1973, Ser. No. 355,083
Int. Cl.[2] C08F *4/20, 32/04*
U.S. Cl. 526—169 16 Claims

1. A process for preparing copolymers of ethylene; of ethylene and an α-olefin having 3–18 carbon atoms; or of ethylene, an α-olefin having 3–18 carbon atoms, and a nonconjugated diene having one polymerizable double bond, with norbornene derivatives, in contact with a catalytic system formed by the association of an organoaluminum compound with a vanadium compoumd; characterized by the fact that contact is established in the presence of said catalyst between ethylene, or between ethylene and an αolefin having 3–18 carbon atoms, or between ethylene, an α-olefin having 3–18 carbon atoms, and a non-conjugated diene, and at least one norbornene derivative of the formula



where *n* is an integer within the range of 0–20 , and R can be an alkyl, aryl, or cycloalkyl containing 1–18 carbon atoms, the aforesaid copolymers being solid at ordinary temperatures.

4,017,670

SUSPENSION POLYMERIZATION PROCESS

John P. Spicuzza, Jr., Pittsburgh, and Frank J. E. Mills, Beaver, both of Pa., assignors to ARCO Polymers, Inc., Philadelphia, Pa.

Filed May 24, 1976, Ser. No. 689,025
Int. Cl.[2] C08F *12/04, 12/08*
U.S. Cl. 526—233 4 Claims

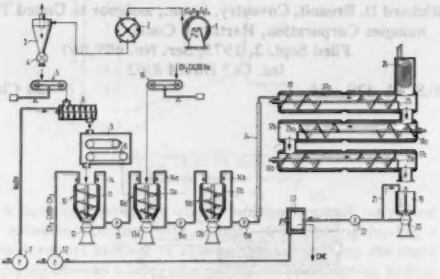
1. In a process for producing polymer beads by adding vinyl aromatic monomer containing from 0.15 to 0.55 percent by weight based on monomer of a monomer-soluble free-radical producing catalyst to an aqueous dispersion of from 0.20 to 1.0 percent by weight based on monomer of a finely divided, difficultly water-soluble phosphate with or without an extender for said phosphate and subjecting the resulting suspension to an elevated temperature to cause said monomer to polymerize, the improvement consisting of treating the aqueous dispersion of phosphate, prior to the addition of monomer, with 40,000 to 60,000 cycles per second ultrasonic waves for at least 10 minutes, whereby the polymer bead size resulting from the polymerization is less than the bead size produced by the same lot of phosphate in the absence of ultrasound.

4,017,671

PROCESS FOR THE CONTINUOUS MANUFACTURE OF CELLULOSE GLYCOLATE

Wolfgang Schminke; Klaus Stölting; Hans Macholdt, and Hans Künkler, all of Wiesbaden-Biebrich, Germany, assignors to Hoechst Aktiengesellschaft, Germany

Filed Jan. 6, 1975, Ser. No. 539,035
Claims priority, application Germany, Jan. 9, 1974, 2400879
Int. Cl.[2] C08B *11/00*
U.S. Cl. 536—98 5 Claims



1. In the process for the continuous manufacture of cellulose glycolate, in which an etherification mixture, initially containing alkali cellulose formed from finely comminuted cellulose and sodium hydroxide solution, sodium chloroacetate and water is conveyed through a reaction zone having a constant temperature of at least 60° C and when said zone has more than one section, a constant temperature in each section, in a manner such that the residence time of the etherification mixture in the reaction zone is sufficient to cause the sodium chloroacetate initially contained in the mixture to react, and in which the etherification mixture is also thoroughly mixed by the application of shearing forces;

the improvement comprising that the etherification mixture initially comprises

1 part by weight of cellulose
0.2 to 0.6 part by weight of sodium hydroxide
0.5 to 1.75 part by weight of sodium monochloroacetate
7 to 22 parts by weight of isopropyl alcohol (100%)

and water corresponding to between 20% and 50% by weight of the isopropyl alcohol,

maintaining the constant temperature of the etherification mixture in the reaction zone in the range of 60° to 90° C,

exerting the shearing forces on the etherification mixture before it enters the reaction zone and at a temperature below 30° C, by homogenizing by means of a homogenizer, the residence time of the etherification mixture in the homogenizing zone being less than 1/10 of its residence time in the reaction zone,

and, after etherification has terminated, separating the fluid components from the solid components of the etherification mixture by mechanical means.

4,017,672

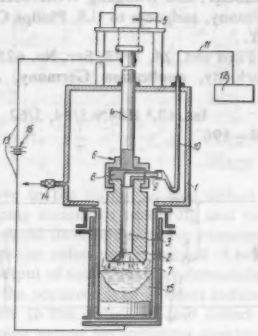
PLASMA-ARC FURNACE FOR REMELTING METALS AND ALLOYS

Boris Evgenievich Paton, ulitsa Kotsjubinskgo 11/13, kv. 21; Viktor Iosifovich Lakomsky, ulitsa Anri Barbjusa, 22–26, kv. 119; Gennady Fedorovich Torkhov, Prazhskaya ulitsa 3, kv. 456; Vladimir Kirillovich Trigub, ulitsa Vernadskogo 63, kv. 61; Ivan Vasilievich Sheiko, ulitsa Schuseva, 36, kv. 32, all of, Kiev; Emil Vasilievich Verkhovtsev, ulitsa Ordzhonikidze, 28, kv. 9, Izhevsk; Sergei Panteleevich Bakumenko, ulitsa Sovetskaya, 21, kv. 17, Izhevsk; Nikolai Alexeevich Ponomarev, ulitsa Truda, 34, kv. 18, Izhevsk, and Anatoly Alexandrovich Kuzmin, ulitsa Sovetskaua, 21, kv. 2, Izhevsk, all of U.S.S.R.

Filed Mar. 11, 1976, Ser. No. 665,934

Int. Cl.² H05H *1/26*

U.S. Cl. 13—2 P 2 Claims



1. A plasma-arc furnace for remelting metals and alloys comprising:

a chamber with openings;

a plasmatron in the form of a consumable electrode of the metal or alloy to be remelted accommodated within said chamber,

said plasmatron having an axial through-going internal space;

a mechanism for moving said plasmatron in a substantially vertical direction;

a water-cooled rod of said plasmatron-moving mechanism extending into said chamber through one of the openings thereof and being operatively connected with said plasmatron;

a water-cooled crystallizer adapted to accumulate therein a liquid metal communicating with said chamber, there being settable a plasma-arc discharge in said crystallizer capable of melting away said plasmatron;

a system for supplying a plasma-yielding gas to said chamber;

a flexible conduit accommodated within said chamber and having one end thereof projecting outwardly of said chamber through one of the openings thereof and communicating with said plasma-yielding gas supply system, the other end of said flexible conduit being connected to said axial through-going internal space of said plasmatron;

and a power supply source to which said water-cooled rod and said crystallizer are connectable.

4,017,673

METHOD AND APPARATUS FOR GRAPHITIZATION OF CARBON MATERIALS

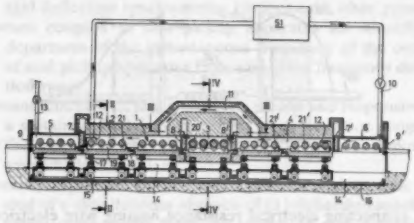
Martin Michels, Kuhlenthal, and Wilhelm Settele, Biberbach, both of Germany, assignors to Sigri Elektrographit GmbH, Meitingen near Augsburg, Germany

Filed Oct. 20, 1975, Ser. No. 624,273

Claims priority, application Germany, Dec. 17, 1974, 2459576

Int. Cl.² F27D *11/04;* F27B *9/00*

U.S. Cl. 13—7 12 Claims



1. Method for graphitization of carbon bodies in a continuous-type furnace which comprises transporting a charge of carbon containing at least one carbon body to be graphitized into a preheating zone of said furnace wherein said charge of carbon is retained by a holding device in said preheating zone and passing a hot inert gas in contact with said carbon charge, transporting said preheated carbon to a graphitization zone in said furnace wherein said preheated carbon is retained in said graphitization zone by a holding device in said zone and heating said preheated carbon by electrical heating means up to a temperature above 2200° C in said graphitization zone to effect graphitization of preheated carbon, transporting said graphitized carbon to a cooling zone in said furnace wherein said graphitized carbon is retained in said cooling zone by a holding device in said zone and cooled in said cooling zone to a temperature below about 500° C, said preheating, graphitization and cooling of said carbon body constituting a cycle of operation, simultaneously subjecting in furnace a carbon charge to preheating, another previously preheated carbon body to graphitization, and a third previously preheated and graphitized carbon body to cooling, and after each cycle removing the cooled graphite body from the holding device in the cooling zone and transporting it out of the cooling zone, removing the graphitized body from the holding device in the graphitizing zone and transporting it to the cooling zone, removing the preheated carbon from the holding device in the preheating zone and transporting it to the graphitizing zone, transporting a new charge of carbon into the preheating zone, and continuing the simultaneous preheating, graphitization and cooling of three different carbon charges and between cycles moving the carbon bodies from the holding devices and transporting the graphite carbon out of the cooling zone, transporting the graphitized carbon to the cooling zone, transporting the preheated carbon to the graphitization zone, and transporting a new charge to the preheating zone.

4,017,674

METHOD FOR STARTING OPERATION OF A RESISTANCE MELTER

Christopher Charles Chapman, Richland, Wash., assignor to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed Jan. 16, 1976, Ser. No. 649,770

Int. Cl.² C03B *5/02;* F27D *11/04;* H05B *3/60*

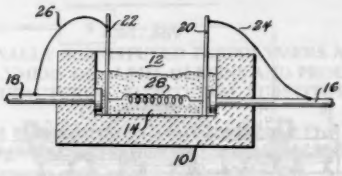
U.S. Cl. 13—23 6 Claims

1. A method for starting the operation of a resistance furnace for melting a charge, wherein the furnace contains two

opposed primary electrodes, heat is produced by the resistance of the charge to current flowing therethrough between the electrodes, and the charge is a material which is essentially electrically nonconductive when in a solid physical state, but which becomes more electrically conductive in a molten physical state comprising:

a. placing first and second start-up electrodes in the charge adjacent the first and second primary electrodes respectively;

b. electrically connecting the primary electrodes to the respective start-up electrode;



c. connecting electrical resistance heating wire electrically between the start-up electrodes, said wire being in contact with the material of the charge along a path between the two electrodes; and

d. passing a current between the primary electrodes through the start-up electrodes and the heating wire, said current being sufficient to heat the wire to a temperature high enough to melt the charge material in contact with the wire to form a path of molten charge material between the primary electrodes so that the current can pass directly between the electrodes through the melted charge material whereby operation of the resistance furnace is started.

4,017,675

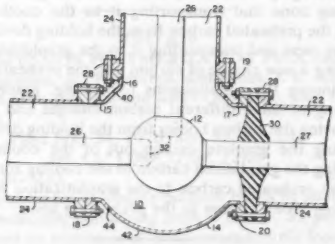
JUNCTION BOX FOR HIGH VOLTAGE GAS INSULATED CONDUCTORS

Melvyn D. Hopkins, Pittsburgh, and Charles B. Wolf, Irwin, both of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed June 6, 1975, Ser. No. 584,430

Int. Cl.² H01B 9/04

U.S. Cl. 174—21 C **7 Claims**



1. A junction box for a high voltage gas insulated system comprising:

a first hemispherically shaped member having an opening formed therein;

a second hemispherically shaped member having an opening formed therein joined to said first hemispherically shaped member to define a spherically shaped cavity;

a first elongated conductor insulated from said first hemispherically shaped member and said second hemispherically shaped member having one end projecting through the opening in said second hemispherically shaped member;

a circular insulating support rigidly joined to said first elongated conductor to rigidly support and position said first elongated conductor;

an electrically conducting inner sphere permanently and rigidly joined to the end of said first elongated conductor within the spherical cavity defined by said first hemispherically shaped member and said second hemispherically shaped member and having a sliding contact opening formed therein, said inner sphere being in electrical contact with said first elongated conductor; and

a second elongated conductor projecting through the opening in said first hemispherically shaped member and engaging the slidable contact opening formed in said inner sphere, said second elongated conductor being in electrical contact with said inner sphere to make electrical contact with said first elongated conductor.

4,017,676

CIRCUIT ARRANGEMENT FOR SEPARATING VIDEO AND AUDIO SIGNALS

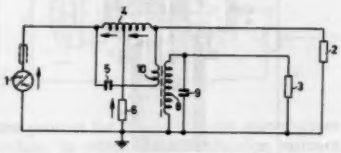
Thorwald Rabeler, and Wolfgang Weltersbach, both of Hamburg, Germany, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Oct. 24, 1975, Ser. No. 625,642

Claims priority, application Germany, Aug. 16, 1975, 2536496

Int. Cl.² H04N 5/44, 5/62

U.S. Cl. 358—196 **10 Claims**



1. A circuit arrangement for decoupling the video signal from an intercarrier sound signal in a television receiver, said circuit comprising an intermediate frequency source of video and sound signals, a sound trap coupled to said source and tuned to the intermediate frequency of the sound signal, a first output impedance from which the video signal can be obtained coupled to the a sound trap, a second output impedance from which the intercarrier sound signal can be obtained, means for coupling the second output impedance to the sound trap and for supplying the intercarrier sound signal from the sound trap to the second impedance, whereby losses are introduced into said sound trap thereby reducing the attenuation of said sound signal at said first output impedance, and means coupled to the sound trap for compensating for the losses, whereby a maximum attenuation for the intercarrier sound signal is produced at the first output impedance.

4,017,677

SQUELCH CIRCUIT FOR A VIDEO RECORD PLAYER

Alfred Lynn Baker, Indianapolis, Ind., assignor to RCA Corporation, New York, N.Y.

Filed June 26, 1975, Ser. No. 590,484

Claims priority, application United Kingdom, Nov. 18, 1974, 49924/74

Int. Cl.² H04N 5/76

U.S. Cl. 358—127 **14 Claims**

1. In a record player, including pickup apparatus for recovering from a record, when said pickup apparatus is in a playback position, carrier waves subject to frequency modulation in accordance with a composite video signal occupying a given frequency band; the combination comprising:

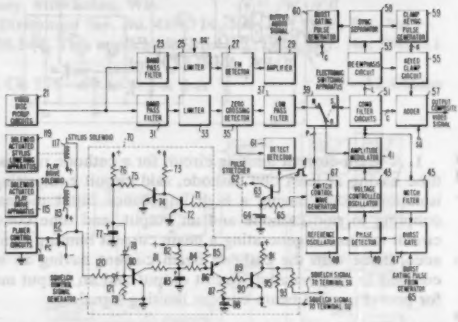
frequency demodulation apparatus responsive to a carrier wave output of said pickup apparatus for developing a demodulated signal output substantially confined to said given frequency band;

signal processing means, normally responsive to said demodulated signal output of said frequency demodulation apparatus, for developing an ouput composite video signal;

delay means, normally responsive to said demodulated signal output of said frequency demodulation apparatus, for providing a delayed composite video signal;

means coupled to said frequency demodulation apparatus for identifying departures of the instantaneous frequency of the input to said demodulation apparatus from a given frequency deviation range;

means for developing defect indication pulses in response to the output of said departure identifying means;



means responsive to the output of said defect indication pulse developing means for rendering said output composite video signal developing means responsive to said delayed composite video signal, instead of said demodulated signal output of said frequency demodulation apparatus, during the occurrence of a defect indication pulse;

means responsive to the output of said defect indication pulse developing means for initiating development of a squelch signal when the duration of a defect indication pulse exceeds a given length of time; and

means for utilizing said squelch signal to inhibit development of said output composite video signal by said signal processing means.

4,017,678

END-OF-PLAY CONTROL SYSTEM

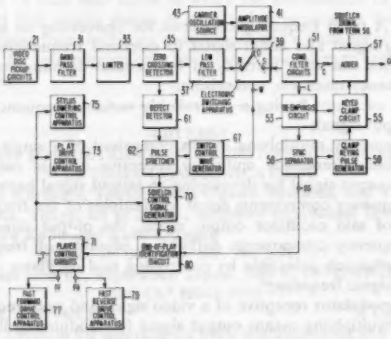
Alfred Lynn Baker, Indianapolis, Ind., assignor to RCA Corporation, New York, N.Y.

Filed June 26, 1975, Ser. No. 590,483

Claims priority, application United Kingdom, Nov. 18, 1974, 49922/74

Int. Cl.² H04N 5/76

U.S. Cl. 358—128 **13 Claims**



1. In playback apparatus for a disc record having a spiral groove containing: (1) recorded picture information, comprising carrier waves modulated in frequency over a given frequency deviation range in accordance with composite video signals, inclusive of deflection synchronizing components and picture signal components, said recorded picture information occupying a first plurality of the groove convolutions; and (2) end-of-recording information, comprising undeviated carrier waves at a frequency within said given deviation range, occupying a second plurality of the groove convolution adjacent to said first plurality; the combination comprising:

pickup apparatus for developing, during disc record playback, a carrier wave output in response to traversal of successive disc record groove convolutions:

means responsive to said carrier wave output for recovering said deflection synchronizing components, when present;

means coupled to said pickup apparatus for identifying departures of the instantaneous frequency of the output of said pickup apparatus from said given frequency deviation range;

means, coupled to said identifying means and responsive to a sustained departure from said given deviation range in the output of said pickup apparatus, for developing a squelch signal; and

means, responsive to the continuance for a given time period of a simultaneous absence of (1) deflection synchronizing components from the output of said recovering means and (2) squelch signal development by said developing means, for automatically terminating said disc record playback.

4,017,679

TELEVISION PICK-UP AND DISPLAY SYSTEM SUITABLE FOR CONTINUOUS AND SHORT-DURATION INFORMATION PICK-UP AND FOR CONTINUOUS DISPLAY

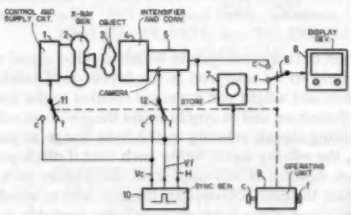
Rudolf Kemner, and Joost Egbert Marquerinck, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Feb. 27, 1975, Ser. No. 553,541

Claims priority, application Netherlands, Mar. 4, 1974, 7402868

Int. Cl.² H04N 7/18

U.S. Cl. 358—111 **4 Claims**



1. Television pick-up and display system suitable for continuous and for short-duration information pick-up and for continuous display, which system comprises a television pick-up device means for information signal generation during each field period using a line scanning raster, a repeatedly readable signal store coupled to the output of the pickup device, a display device means for displaying a television picture according to a standard having two interlaced line scanning rasters, a control circuit means coupled to said pick up device and said store for selecting either the continuous or the short-duration pick-up operation, said control circuit comprising a switchable synchronizing pulse generator means coupled to said pick-up device for applying during short-duration operation in a single field period a single line-scanning raster to the pick-up device for information signal generation, which raster has an integral number of lines and for applying to said pick-up device a standard line-scanning raster having a fractional

number of lines during continuous operation, and a switching device means coupled to said control circuit for coupling during short-duration operation the pick-up device to the signal store for storing the information signal generated in the single field period in which the line scanning raster having the integral number of lines is used, and for coupling the display device to the repeatedly readable signal store containing the information of the single line scanning raster having the integral number of lines after said single field period.

4,017,680

METHODS AND APPARATUS INVOLVING LIGHT PEN INTERACTION WITH A REAL TIME DISPLAY

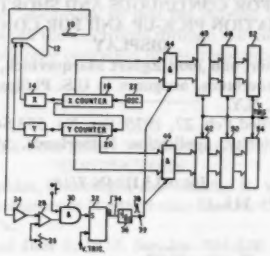
Robert William Anderson, Fenstanton; William Ralph Knowles, Royston, and John Edward Culley, Arrington, all of England, assignors to Image Analysing Computers Limited, England

Filed July 8, 1975, Ser. No. 594,016

Claims priority, application United Kingdom, July 26, 1974, 33260/74; Sept. 20, 1974, 41186/74

Int. Cl.² H04N 7/18

U.S. Cl. 358—242 **30 Claims**



1. A method of image analysis in which a video signal of an image of a field to be analyzed is displayed on a television monitor screen and a light pen is moved relative to the display to generate therefrom and in synchronism therewith an editing signal for editing signals relating to the field image as part of the analysis, the editing signal being such that if displayed on the television monitor it will appear in the display as a line which indicates the path followed by the pen, and in which the editing signal is stored in a memory so as to be available during subsequent frame scans, further comprising the steps of:

during one frame scan storing a position signal describing the position of one point only in the raster seen by the light pen during that frame scan,

storing during a second frame scan a position signal describing the position of another single point seen by the light pen during that scan,

generating by interpolation during a third frame scan short duration electrical pulses to occur during the scanning of any raster lines intermediate the lines containing the point seen during the said one frame scan and the point seen during the said second frame scan, said generated pulses being positioned along their respective lines so as together to define when displayed a straight line trace in the television display between the two said points; and

storing said interpolated short duration pulses in the memory with pulses occuring at the two said points during the scanning to form a least a part of said stored editing signal.

4,017,681

TELEVISION RECEIVER INCLUDING A BEAM CURRENT LIMITING CIRCUIT

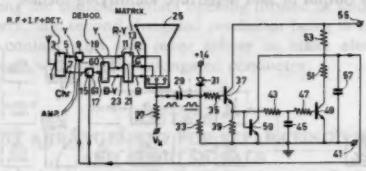
Wouter Smeulers, and Willem Hendrik Amsen, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Aug. 27, 1975, Ser. No. 608,393

Claims priority, application Netherlands, Sept. 9, 1974, 7411912

Int. Cl.² H04N 5/68

U.S. Cl. 358—171 **7 Claims**



1. A beam current limiting circuit for a cathode ray display tube having at least one cathode, said circuit comprising an isolation circuit having a high impedance input means for coupling to said cathode and an output, and time constant circuit means for generating a beam current limiting signal in accordance with the cathode beam current having an input coupled to said isolation circuit output and an output means for providing said beam current limiting signal.

4,017,682

RADIO FREQUENCY CONVERTER

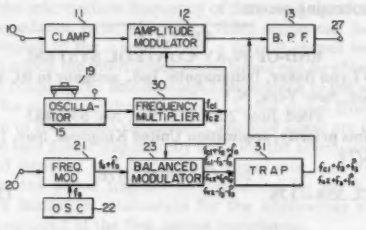
Takayuki Tojo, Yokohama, Japan, assignor to Victor Company of Japan, Limited, Japan

Filed Aug. 6, 1974, Ser. No. 495,298

Claims priority, application Japan, Aug. 9, 1973, 48-93107; Oct. 15, 1973, 48-118699; Oct. 15, 1973, 48-118700

Int. Cl.² H04N 5/38, 7/06

U.S. Cl. 358—167 **6 Claims**



1. A radio frequency converter for converting an applied video signal and audio signal to sideband frequencies of a selected one of a plurality of frequencies defining separate frequency channels, comprising:

an oscillator having a controllably variable frequency output signal;

frequency multiplying means comprised of a single wideband frequency multiplier receptive of said oscillator output signal for developing an output signal having frequency components equal to multiples of the frequency of said oscillator output signal, the output signal frequency components defining a plurality of frequency channels selectible by controlling said oscillator output signal frequency;

a modulator receptive of a video signal and said frequency multiplying means output signal for modulating the frequency multiplying means output signal to develop video signal sidebands;

a balanced modulator receptive of a modulted audio signal

and said frequency multiplying means output signal of mixing the two signals to develop audio signal sidebands; and

filtering means receptive of the modulated output signals from said modulator and said balanced modulator for filtering unwanted sidebands from the modulated signals.

4,017,683

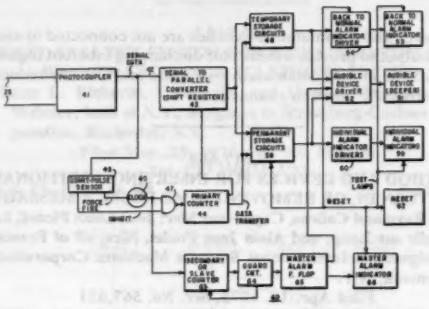
DIGITAL MULTIPLEXING SYSTEM EMPLOYING REMOTE SCANNING OF A PLURALITY OF MONITORING POINTS

Carl N. Pederson, Westmont, and Peter G. Angelopoulos, Elmhurst, both of Ill., assignors to Johnson Service Company, Milwaukee, Wis.

Division of Ser. No. 419,714, Nov. 28, 1973, Pat. No. 3,938,144. This application June 25, 1975, Ser. No. 590,311

Int. Cl.² H04L *7/04*

U.S. Cl. 178—69.1 **12 Claims**



1. In a multiplexed data transmission system for transmitting data over a transmission line from a first location to a second location, first sender means at said first location including means for generating a serial pulse train including a start pulse and a plurality of data pulses during each of a plurality of time frames, inhibit means for inhibiting the transmission of pulse trains during alternate time frames, and means for transmitting the pulse train provided during at least certain ones of said time frames to said second location over said transmission line, first receiver means at said second location including means for receiving said pulse train, data storage means, sequencing means including clock pulse generating means responsive to the start pulse to provide a plurality of clock pulses for enabling said data pulses to be gated into said data storage means, and second sender means at said second location having means enabled by said sequencing means during a portion of each time frame in which the transmission of data by said first sender means is inhibited to generate a further serial pulse train, including a start pulse and a plurality of data pulses, for transmission over said transmission line to said first location.

4,017,684

SYSTEM FOR DETERMINING BURST SENDING TIMING IN TDMA COMMUNICATION

Hiroshi Kurihara, Tokyo; Akira Ogawa, Machida, and Yasuo Hirata, Tokyo, all of Japan, assignors to Kokusai Denshin Denwa Kabushiki Kaisha, Japan

Filed July 3, 1975, Ser. No. 592,717

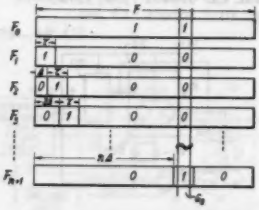
Claims priority, application Japan, July 5, 1974, 49-76499

Int. Cl.² H04S *3/06*

U.S. Cl. 178—69.1 **4 Claims**

1. In a system for determining burst sending timing in a time division multiple access communication system of the type including a communication satellite, in which burst signals transmitted from a plurality of stations are received by the communication satellite which includes means for arranging the received time signals within one time frame at predetermined intervals, and means for transmitting the arranged burst signals, the improvement comprising:

a transmitting side in one of said stations for transmitting burst signals to the communication satellite and comprising first transmitting means for transmitting a first signal having a first signal state over one entire frame length, and second transmitting means connected to and coactive with said first transmitting means for transmitting after said first signal a sequence of successive signals each having a duration of one frame and each having the first signal state and a second signal state different from said first signal state, wherein the position or duration of said



first signal state within the respective frames over which said successive signals are defined is altered by a certain amount between each successive signal; and

a receiving side for receiving burst signal transmitted from the communication satellite and comprising counting means for counting the number of frames of the burst signals transmitted during a duration from the detection of said first signal to the detection of the next first or second state at a predetermined time slot in a frame of the burst signals, and means for determining the sending timing of the same station in accordance with said counted number of frames and said certain amount that the position or duration of said first signal state is altered between the respective frames of said successive signals.

4,017,685

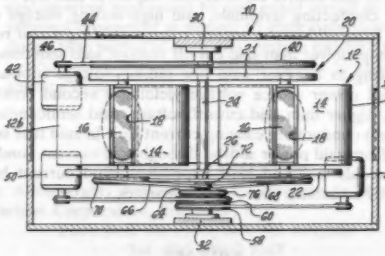
PLANETARY ACOUSTIC PHASE SHIFT MECHANISM

Donald J. Leslie, 1561 Gaywood Drive, Altadena, Calif. 91001

Filed July 28, 1975, Ser. No. 599,404

Int. Cl.² H04R *1/28*

U.S. Cl. 179—1.5 **10 Claims**



1. In apparatus for superimposing a frequency or phase modulation upon an acoustic phase shift device:

a. a speaker having a cone;

b. a rotor for the speaker and forming with the speaker cone, a sound channel having a sound emitting opening;

c. a support for the speaker rotor;

d. means mounting the speaker rotor on the support for rotation about an axis spaced from said sound emitting opening to impart orbital movement to the sound emitting opening and rotation to the sound radiation pattern produced thereby;

e. means mounting the support for rotation about an axis substantially parallel to, but spaced from, the axis of movement of said rotor axis so that a substantially epicycloidal movement is imparted to said sound emitting opening upon rotation of said support and said rotor; and

f. means rotating both said support and said rotor.

4,017,686

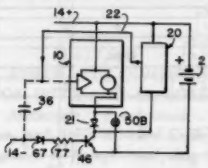
TELEPHONE LINE VOLTAGE ACTUATED SWITCHES

Leonard M. Todd, 424 W. 119th St., New York, N.Y. 10027

Continuation-in-part of Ser. No. 250,068, May 3, 1972, Pat. No. 3,794,767. This application Sept. 26, 1973, Ser. No. 401,062

Int. Cl.² H04M *1/00, 11/00*

U.S. Cl. 179—2 R **3 Claims**



1. A voltage actuated switch for a telephone line having first and second conductors and a high resting and a low talking voltage comprising a semiconductor having a control element and two current conducting terminals, a load impedance and a power source having two terminals, said semiconductor ceasing to conduct when a voltage impressed on said control element with respect to one of said current conducting terminals is lower than a cut-off voltage, said semiconductor conducting when a voltage impressed on said control element with respect to said one of said current conducting terminals is higher than said cut-off voltage; said current conducting terminals, said load impedance and said power source connected in a first series circuit; a second series circuit comprising (a) said first conductor connected to said control element, (b) one of said current conducting terminals connected to one terminal of said power source, (c) the other of said terminals of said power source connected to said second conductor; said power source connected in voltage opposition to said telephone line voltage, said telephone line voltage and said power source voltage combining vectorially to a resultant voltage applied to said control element with respect to said one of said current conducting terminals, said high resting voltage subtracted from said power source voltage yielding a first resultant voltage lower than said cut-off voltage, said semiconductor ceasing to conduct, said low talking voltage subtracted from said power source voltage yielding a second resultant voltage, higher than said cut-off voltage, said semiconductor going into conduction, causing current flow in said first series circuit from said power source through said current conducting terminals and said load impedance, said current being employed to actuate associated apparatus.

4,017,687

DEVICE FOR MINIMIZING INTERCHANNEL CROSSTALK IN HIGH RATE COMMUTATOR MULTIPLEXERS

Franklin R. Hartzler, Camarillo, and Michael V. Wechsler, Ventura, both of Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Nov. 28, 1975, Ser. No. 635,821

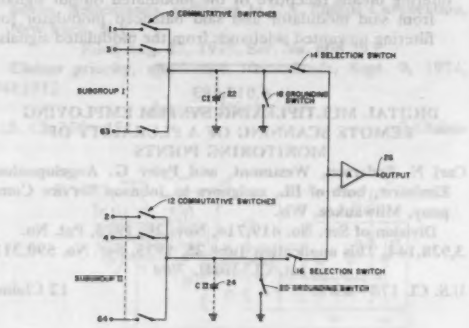
Int. Cl.² H04J *3/10*

U.S. Cl. 179—15 A **7 Claims**

5. A device for reducing crosstalk between channels of a rapid commutator multiplexer commutator comprising:

a. means for alternatively switching two subgroups of commutative switches to a single output;

b. means for grounding said commutative switches whenever said commutative switches are not connected to said output to provide a means for discharging inherent capacitance in said commutative switches and thereby reduce crosstalk between channels.



4,017,688

METHOD AND DEVICES FOR INSERTING ADDITIONAL PATTERN IN, OR REMOVING SAME FROM, A MESSAGE

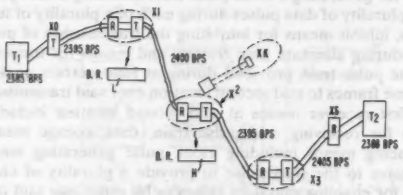
Paul Raymond Callens, Cagnes sur Mer; Jean Louis Picard, La Colle sur Loup, and Alain Jean Poulet, Nice, all of France, assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Apr. 10, 1975, Ser. No. 567,021

Claims priority, application France, Apr. 12, 1974, 74.14306

Int. Cl.² H04J *3/06*

U.S. Cl. 179—15 AF **10 Claims**



1. The method of inserting a plurality of additional patterns of elements into a message comprising a plurality of said elements, said message being transmitted from a sending device through a plurality of communication links to a receiving device, so that any node may insert said additional patterns into said message at any time and at any place within said message and so that said additional patterns may be selectively deleted from said message by any node, as necessary to make the number of elements available for transmission over each of said links correspond to an element transmission rate of said each of said links, said method comprising the steps of:

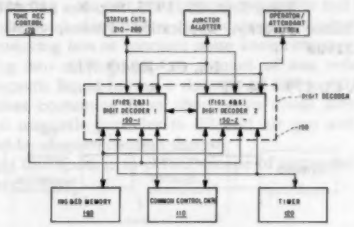
1. modifying said message at said sending device so that a sequence of said elements of said message does not contain a pattern of K*i* elements identical to any one of a plurality of patterns of K*i* additional elements which may be inserted at one of said nodes prior to transmission over one of said links, where K*i* is an integer greater than zero but not greater than K, where K and P are integers, and where $K = P^n$ defines a family of order *n* comprised of K possible combinations of *n* of said elements, each of said elements being capable of assuming P values;

2. storing said elements comprising said message in a buffer as said elements become available from said sending device;
3. transmitting said elements, one at a time, from said buffer over said one of said links;
4. detecting when the number of said elements available for transmission from said buffer is less than a predetermined number;
5. generating one of said patterns of K*i* additional elements to be transmitted following *n* of said elements from said buffer, the last *n* of said elements of said one of said patterns of K*i* additional elements being identical to said *n* of said elements from said buffer, and wherein one of said K possible combinations of *n* elements is formed by each element *i* of said one of said patterns of K*i* additional elements with *n*−1 of said elements which precede said element *i*, and where *i* is an integer greater than zero and not greater than K*i*; and
6. transmitting said pattern of K*i* additional elements following said *n* of said elements from said buffer.

4,017,689
DIGIT ANALYSIS SYSTEM FOR PRIVATE AUTOMATIC BRANCH EXCHANGE TELEPHONE SYSTEM

Glenn L. Richards, Caledonia, and Uwe A. Pommerening, Webster, both of N.Y., assignors to Stromberg-Carlson Corporation, Rochester, N.Y.

Filed Mar. 25, 1975, Ser. No. 561,796
Int. Cl.² H04M *3/22*
U.S. Cl. 179—18 EB **7 Claims**



1. In a common control type private automatic branch exchange telephone system having a memory containing a plurality of storage positions for storing the respective digits identifying a called number in response to dialed number information and a digit decoder for analyzing the contents of said memory and for supplying to the common control circuits of said system signals representative of further action which is necessary for processing the call, the improvement wherein said digit decoder comprises

first means, responsive to the reception of a first complete digit in the called number, for storing a prescribed digital code, the value of which is not exclusively established to correspond to the value of said first complete digit, in a first selected one of said plurality of storage positions within said memory;

second means, responsive to the reception of respective subsequent complete digits in the called number, for storing respective digital codes, corresponding to the values of said subsequent complete digits in respective selected ones of said plurality of storage positions within said memory; and

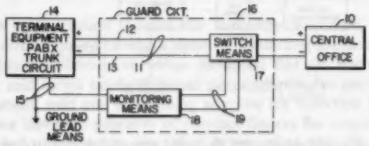
third means, responsive to the reception of the last complete digit necessary for identifying the course of action to be taken by the system, for supplying a signal representative thereof to said common control circuits, and wherein

the number of said plurality of storage positions within said memory corresponds to the number of digits identifying the line circuits within said system and wherein said decoder includes fourth means for storing each respective consecutively received digit in the same selected storage position as it is received for analysis by the decoder and for subsequently clearing said same selected storage position upon the completion of the processing of each received digit which is followed by a subsequent digit necessary for complete analysis of the called number.

4,017,690
GUARD CIRCUIT FOR GROUND START TELEPHONE EQUIPMENT

George Leonard Rosing, Sylmar, Calif., assignor to General Telephone Company of California, Santa Monica, Calif.

Filed July 2, 1976, Ser. No. 702,007
Int. Cl.² H04M *7/10*
U.S. Cl. 179—18 AH **5 Claims**



1. A guard circuit for ground start telephone equipment made up of a central office connected through a two wire trunk comprising positive and negative lines to customer terminal equipment with ground lead means, said guard circuit including in combination:

a. switch means connected to said positive and negative lines and responsive to removal of positive potential from the positive line and application of negative potential to the negative line when a call on said two wire trunk is released at said central office, to disconnect said two wire trunk between said central office and said terminal equipment; and,

b. monitoring means connected between said ground lead means at said terminal equipment and said switch means and responsive to removal of positive potential from said ground lead means upon completion of release and reconditioning of said terminal equipment to receive a subsequent call, to reset said switch means and thereby reconnect said two wire trunk between said central office and terminal equipment, the period of time that the terminal equipment is subject to glare being reduced by the time interval that said central office is disconnected from said terminal equipment by said guard circuit so that the terminal equipment is subject to glare only during a reduced time period of from one tenth to one fifth the time period such equipment would be subject to glare in the absence of said guard circuit.

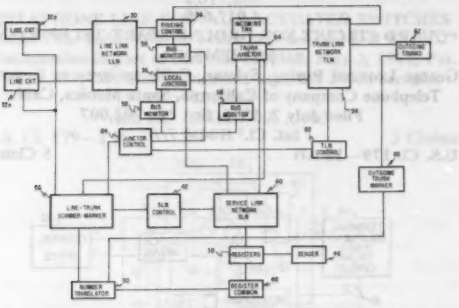
4,017,691
NUMBER TRANSLATOR

Otto Altenburger, Rochester, N.Y., assignor to Stromberg-Carlson Corporation, Rochester, N.Y.

Filed Dec. 10, 1975, Ser. No. 639,308
Int. Cl.² H04Q *3/47*
U.S. Cl. 179—18 ET **12 Claims**

1. In a telephone system including a plurality of subscriber stations identified by an equipment number and a directory number, a plurality of groups of outgoing trunk circuits, and common control means including a plurality of registers for connecting subscriber stations together or to a trunk circuit in response to a signal designating the directory number of a called station received from a calling station, a number translator comprising a memory system including memory means for storing in respective memory locations the equipment and directory numbers and other data relating to each of said plurality of subscriber stations and comparator means for

comparing a directory number or equipment number with the data stored in said memory means so as to address a specific memory location; register digit storage means including a plurality of storage locations for storing equipment and directory number data, type of call data, and a translator memory request received from a register; means for sequentially scanning the storage locations of said register digit storage means



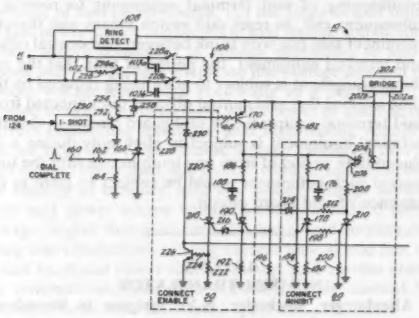
to read out data stored therein; translator control means responsive to said memory request stored in said register digit storage means read out by said scanning means for transferring said number data therein to said comparator means; and register sender control means responsive to said translator control means for transferring data from a specific memory location addressed by said comparator means to a register.

4,017,692

TELEPHONE CALL-DIVERTER SYSTEM

Mario Garcia, Bridgeport, and Robert C. Bell, Manchester, both of Conn., assignors to Dictaphone Corporation, Rye, N.Y.

Filed Aug. 22, 1975, Ser. No. 608,692
Int. Cl.² H04M 3/54
U.S. Cl. 179—81 R **12 Claims**



1. In a telephone call-diverter system for interconnecting an incoming telephone line to an outgoing telephone line so that an incoming telephone call can be transferred to a predetermined remote telephone station, apparatus for connecting said incoming and outgoing telephone lines to permit voice frequency communication therebetween, comprising:

first switch means responsive to a detected ringing signal for completing a circuit from said call-diverter system to said outgoing line, said first switch means further enabling an energizing voltage to be supplied to a power supply terminal;

dial control means for transmitting predetermined dialing signals to said outgoing line from said call-diverter system;

second switch means responsive to the completion of the transmission of dialing signals to supply said energizing voltage to first and second time delay means to thereby energize said first and second time delay means, said first and second time delay means having different time delay characteristics such that said first time delay means generates a first actuating signal prior in time to a second actuating signal generated by said second time delay means;

third switch means actuated in response to said first actuating signal for de-energizing said second time delay means to prevent said second actuating signal from being generated;

answer signal detecting means for detecting an answer signal returned automatically to said call-diverter system over said outgoing line when said predetermined remote telephone station responds to said dialing signals transmitted thereto to thereby deactuate said third switch means and enable said second time delay means to generate said second actuating signal; and

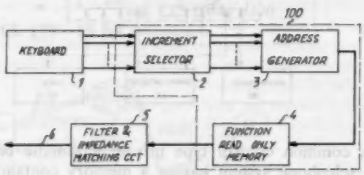
fourth switch means responsive to said second actuating signal for completing a circuit from said incoming line to said call-diverter system to thereby provide a communication channel between said incoming and outgoing lines.

4,017,693

SYNTHESIZER OF MULTIFREQUENCY CODE SIGNALS

Bernard G. Roche, Pavillon 18, Residence de Bourgogne; Jacques Majos, Boulevard d'Armor Batiment AC2, and Jean-Louis A. Lardy, Les Fontaines Batiment 22, all of Lannion, France (22300)

Filed Sept. 29, 1975, Ser. No. 617,488
Claims priority, application France, Sept. 30, 1974, 74-32908
Int. Cl.² H04Q 9/12
U.S. Cl. 179—84 VF **6 Claims**



1. A digital generator of groups of sinusoidal signals of predetermined frequencies, each predetermined frequency being equal to the product of a common fundamental frequency by an increment specific to such predetermined frequency, said generator comprising:

a selector of the increments corresponding to the group of frequencies to be generated;

said selector having accumulation means for obtaining digital values of the selected increments and of consecutive multiples of said increments;

a read only memory for said increments and said multiples which are adapted to be read in said read only memory which constitutes a first subset of addresses of a first subset of words representing samples of a sinusoidal function in a range of equally distributed angular argument values from 0 to $\pi/2$ radians;

means for delivering to the ouputs of said selector said first subset of addresses in interlaced form at a fixed timing;

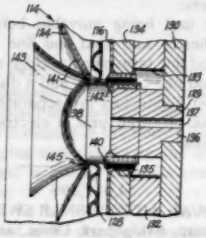
an address converter the inputs of which are connected to the outputs of said selector and having means for periodically transmitting by said delivery means of the outputs of said converter the said first subset of addresses and also a second subset of addresses obtained as the complements to said argument values corresponding to a range from $\pi/2$ to πradiams; and

said read only memory containing at said first subset of addresses and at said subset of words a second subset of addresses and a second subset of words respectively which are representative of samples of said function in the range from $\pi/2$ to πradians.

4,017,694
METHOD FOR MAKING LOUDSPEAKER WITH MAGNETIC FLUID ENVELOPING THE VOICE COIL

John A. King, Mentor, Ohio, assignor to Essex Group, Inc., Fort Wayne, Ind.

Filed Feb. 18, 1976, Ser. No. 659,047
Int. Cl.² H04R 9/02
U.S. Cl. 179—115.5 VC **10 Claims**



1. A method for increasing the damping of a moving coil loudspeaker having a magnet, an air gap between the coil and a mounting plate and of increasing electrical power dissipation without introducing hiss or spurious noise comprising:

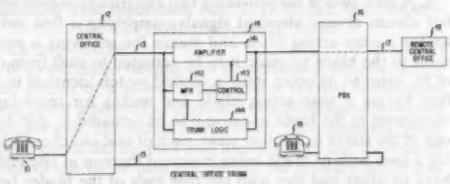
introducing into said air gap an amount of non volatile ferromagnetic liquid having a viscosity of 600 to 10,000 centipoises containing from about 4 to about 20% of colloidal magnetic particles to fill said air gap and be confined by magnetic action therein;

and venting said speaker to permit escape of entrapped air and prevent hiss.

4,017,695
CUSTOMER OPERATED GAIN CONTROL CIRCUIT

George Richard Jaconetty, and Steven Robert Palmquist, both of Boulder, Colo., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Sept. 30, 1974, Ser. No. 510,430
Int. Cl.² H04B 3/36
U.S. Cl. 179—170 R **13 Claims**



1. Apparatus for controlling the gain in a switching path between any pair of a plurality of subscriber station sets each of said sets having call signaling means, said apparatus comprising, in combination,

an amplifier connected in said path,

means for detecting signals from said call signaling means subsequent to the establishment of said path,

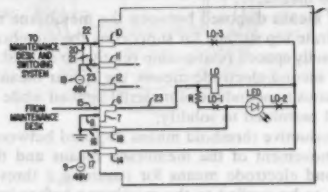
means including an up/down counter responsive to said detecting means for generating control signals, and

means responsive to the generation of said control signals for adjusting the gain of said amplifier.

4,017,696
INITIALIZING CIRCUIT

Robert James Falk, Columbus, Ohio, assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Dec. 31, 1975, Ser. No. 645,655
Int. Cl.² H04M 3/22
U.S. Cl. 179—175 **10 Claims**



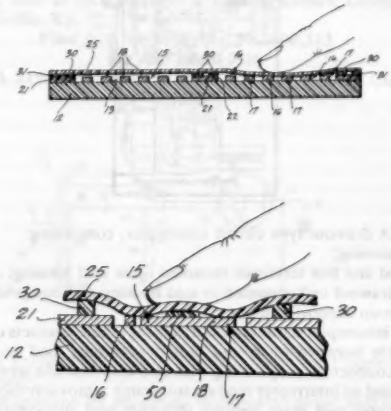
1. An initialization circuit for circuitry mounted on a printed circuit board having a sheet of insulating material and a plurality of conductive strips mounted flat on each side thereof, said strips being oriented perpendicular to one edge of said sheet, said one edge being adapted for insertion into a connector having a plurality of contact fingers for contacting said strips to establish electrical connection thereto, said circuit comprising,

a conductive contact comprising a generally L-shaped conductive strip mounted flat on one side of said sheet and having one leg of said L-shaped strip parallel to said one edge, said contact slidably engaging one of said plurality of fingers when said board is partially inserted into said connector and said contact sliding past said one finger and breaking contact with said finger when said board is fully inserted into said connector whereby a momentary connection between said one finger and said contact is established to initialize said circuitry when said board is inserted into said connector.

4,017,697
KEYBOARD MEMBRANE SWITCH HAVING THRESHOLD FORCE STRUCTURE

Willis August Larson, Mequon, Wis., assignor to Globe-Union Inc., Milwaukee, Wis.

Filed Sept. 15, 1975, Ser. No. 613,254
Int. Cl.² H01H 13/52, 1/50
U.S. Cl. 200—5 A **17 Claims**



1. Membrane switch apparatus for accepting input signals from the touch of a user and for providing output signals for use with an electrical circuit comprising:

a nonconductive substrate having a generally planar top surface;

at least one first electrode means supported on the top surface of the substrate;

at least one second electrode means supported by the top surface of the substrate and spaced from and electrically isolated from the first electrode means;

flexible membrane means supported adjacent the first and second electrode means for selectively being deflected to bridge and electrically couple the first and second electrode means;

spacer means disposed between the membrane means and the substrate top surface for supporting the membrane means in a normally spaced relationship relative to at least one of the first and second electrode means, the spacer means comprising a viscous nonconductive material applied while in a liquid state and permitted to solidify;

nonconductive threshold means disposed between the path of movement of the membrane means and the first or second electrode means for requiring a threshold pressure to be applied to the membrane before bridging occurs, said threshold means comprising a nonconductive paint or resin material applied while in a liquid state and permitted to solidify, said material partially masking the contact area between the membrane means and the first or second electrode means; and

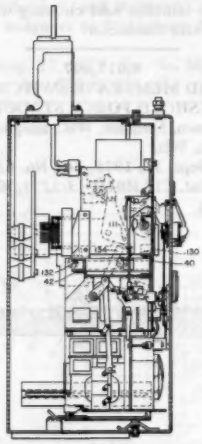
means for electrically connecting the first and second electrode means to the electrical circuit.

4,017,698

DRAW-OUT TYPE CIRCUIT INTERRUPTER WITH MODULAR CONSTRUCTION

Edmund W. Kuhn; Jesse L. Uber, and Joseph D. Findley, Jr., all of Pittsburgh, Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Apr. 2, 1975, Ser. No. 564,573
Int. Cl.² H01H 9/22
U.S. Cl. 200—50 AA **5 Claims**



1. A drawout type circuit interrupter, comprising:

a housing;

load and line terminals mounted upon said housing; and

a drawout unit mounted in said housing and comprising:

a main support structure;

an interrupter module comprising separable contacts operable between open and closed positions, load and line connectors cooperating with said load and line terminals, and an interrupter module sub-frame removably mounted upon said main support structure and supporting said contacts and said connectors;

a mechanism module comprising an operating mechanism for operating said separable contacts between open and closed positions and a mechanism module sub-frame removably mounted upon said main support structure and supporting said operating mechanism;

a control module for electrically activating said operating mechanism to operate said contacts between open and closed positions, said control module comprisng electrical control components and a control module sub-frame removably mounted upon said main support structure and supporting said control components;

trip means coupled to said mechanism module and operable upon actuation to cause said mechanism module to operate said contacts to an open position; and

an interlock lever associated with said trip means and extending into proximity to said control module, said lever being movable between a first position and a second position, movement of said lever to said second position actuating said trip means, said control module maintaining said lever in said first position and preventing movement of said lever to said second position if and only if said control module is fully inserted into said main support structure;

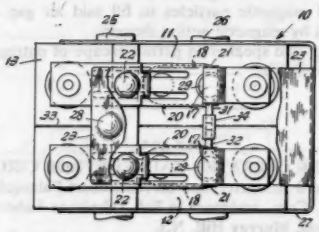
said drawout unit being movable between a connected position wherein said load and line connectors engage said load and line terminals to bridge said contacts across said load and line terminals, and a disconnected position wherein said connectors are separated from said terminals and said drawout unit is electrically isolated from said terminals.

4,017,699

DUAL ACTING SNAP SWITCH

Robert R. Hellman, Bridgeport, Conn., assignor to Westport Development & Mfg. Co., Inc., Milford, Conn.

Filed May 12, 1975, Ser. No. 576,705
Int. Cl.² H01H 13/36
U.S. Cl. 200—67 D **4 Claims**

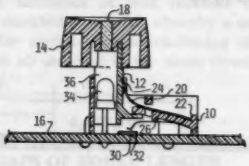


1. A dual switch for providing two electrically independent but almost always identical signals comprising a first switch having a snap-acting blade and means for receiving a movement to the blade to cause it to be actuated to shift from one of its states to its other state, a second switch identical to the first having a snap-acting blade and means for receiving a movement to the blade to cause it to be actuated to shift from one of the states to its other state, each of said switches including a base with its blade being mounted thereon at one end to have its other end free with the free ends of the blades being adjacent and moving in the same direction to produce the same signal, means securing the switches together with both blades being actuated by no more than a small difference in movement therebetween, means for applying an identical movement to the means for receiving of each blade to urge their actuation and means for causing the blade that is initially actuated to apply a force to the other blade to urge it to be actuated to the same state as the initially actuated blade, said means including a mechanical connection that is electrically non-conducting between the two free ends of the blade whereby the force from the initially actuated blade is obtained from the free end of the blade and is applied at the free end of the other blade.

4,017,700
MODULAR PRINTED CIRCUIT BOARD MOUNTABLE PUSH-BUTTON SWITCH WITH TACTILE FEEDBACK

William J. West, Los Altos, Calif., assignor to Hewlett-Packard Company, Palo Alto, Calif.

Filed July 3, 1975, Ser. No. 593,078
Int. Cl.² H01H 3/12
U.S. Cl. 200—314 9 Claims



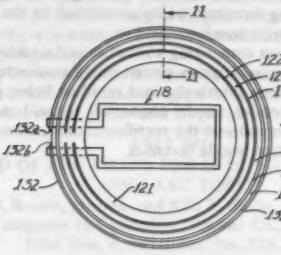
1. A push-button switch mechanism comprising:
a body having a passage and a support member therein;
a cantilevered contact member mounted in the body;
a plunger slidably mounted in the body passage and having a tab for engaging and deflecting the contact member when the plunger is moved from an extended to a depressed position;
a button attached to the plunger for moving the plunger from the extended to the depressed position when force is applied to the button; and
a leaf spring retained in the body and supported along a portion of its length by the support member having a first end abutting an abutment in the body and a second end abutting an abutment on the plunger for holding the plunger in the extended position when no force is being applied to the button, the plunger forcing the first end of the leaf spring toward the second end of the leaf spring along a longitudinal axis thereof and causing the leaf spring to buckle when the plunger is moved from the extended to the depressed position in response to force being applied to the button to provide tactile feedback indicating that the plunger has been depressed, and the leaf spring forcing the plunger back to the extended position when force is removed from the button.

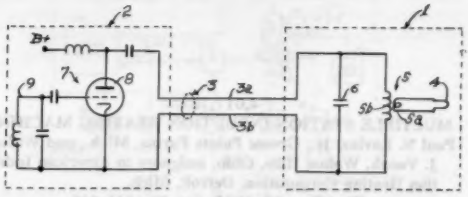
4,017,701
INDUCTION HEATING UNIT WITH COMBINED TANK CIRCUIT AND HEATING COIL

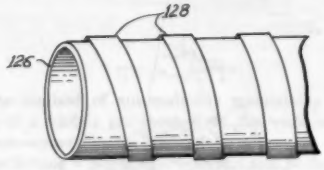
Eugene Mittelmann, Chicago, Ill., assignor to Illinois Tool Works Inc., Chicago, Ill.

Division of Ser. No. 364,221, May 25, 1973, abandoned, which is a continuation of Ser. No. 230,234, Feb. 29, 1972, abandoned. This application Feb. 7, 1975, Ser. No. 548,039
Int. Cl.² H05B 5/08; H01F 15/14
U.S. Cl. 219—10.49 8 Claims

1. In an induction heating unit the structural interrelation of a tank circuit of a power supply and a current transformer formed about a generally cylindrical tubular support providing a compact unit, the unit including a first, multiturn coil means wrapped about the support and forming both the inductance element of the tuned tank circuit and the primary winding of a current transformer, laminated tubular capacitance means formed about the support and providing the capacitance of the tuned tank circuit, second coil means formed about the support and providing the secondary coil of the current transformer, inductive heating means connected to the second coil means for developing induction heating currents in an article to be heated, wherein the coil means and capacitance means are all cooperatively laminated over the support structure, the capacitance means being formed about the support structure with a pair of conductive sheet material layers having a layer of dielectric material formed therebetween, a layer of electrical insulating material formed over the layers of conductive sheet material, a ribbon-like first coil means deposited over the layer of electrical insulating material, a further layer of electrical insulating material formed over the first coil and a





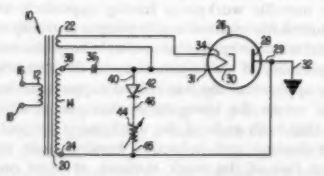


single turn of metal sheet material forming a second coil means formed over said further layer of insulating material.

4,017,702
MICROWAVE OVEN INCLUDING APPARATUS FOR VARYING POWER LEVEL

Larry R. Harmon, Jeffersontown, and Donald J. Simon, Louisville, both of Ky., assignors to General Electric Company, Louisville, Ky.

Filed July 30, 1975, Ser. No. 600,313
Int. Cl.² H05B 9/06
U.S. Cl. 219—10.55 B 10 Claims



1. In a microwave oven, variable power level apparatus comprising:
a. a magnetron for producing microwave energy, said magnetron having anode and cathode terminals;
b. a capacitor;
c. a power transformer including a primary winding having terminals for connection to an AC power source and a high voltage secondary winding having two terminals, one of said high voltage secondary winding terminals being

connected through said capacitor to one of said magnetron terminals and the other of said high voltage secondary winding terminals being connected to the other of said magnetron terminals; and

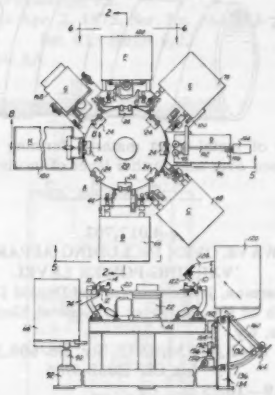
d. a series circuit comprising a rectifier and a variable resistance means, said series circuit being connected across said magnetron terminals, said rectifier being polarized with the rectifier anode connected to said magnetron cathode terminal and the rectifier cathode connected to said magnetron anode terminal.

4,017,703

MULTIPLE STATION INDUCTION HEATING MACHINE

Paul N. Lavins, Jr., Grosse Pointe Farms, Mich., and Willard J. Vanek, Walton Hills, Ohio, assignors to American Induction Heating Corporation, Detroit, Mich.

Filed Dec. 17, 1975, Ser. No. 641,448
Int. Cl.² H05B 5/06
U.S. Cl. 219—10.69 **18 Claims**



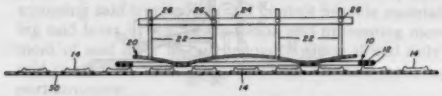
1. Apparatus for performing heat treatment on both ends of an elongate metallic workpiece having oppositely extending ends in an automatic manner comprising: a plurality of spaced work stations; transfer apparatus movable between each of the stations; a plurality of workpiece support devices attached to the transfer apparatus, the workpiece support devices being operative to retain the elongate workpieces at their center sections so that both ends of the workpieces project clear of the support devices and induction heating coils associated with at least two of the work stations, at least one of the induction heating coils being so positioned with respect to the transfer apparatus that it heats a first end of workpieces retained on support devices as they are moved by the transfer mechanism into operative position with respect to the station with which that coil is associated, and at least one other coil being so positioned relative to the transfer apparatus that it heats the opposite end of workpieces retained on support devices as they are moved by the transfer mechanism into operative position with respect to the station with which that coil is associated.

4,017,704

INDUCTION HEATING APPARATUS AND METHOD FOR USING THE SAME

John W. Collins, III, Allegheny Township, Westmoreland County, and E. Scott Douds, Pittsburgh, both of Pa., assignors to Aluminum Company of America, Pittsburgh, Pa.

Continuation-in-part of Ser. No. 455,559, March 28, 1974, abandoned. This application Apr. 22, 1975, Ser. No. 570,486
Int. Cl.² H05B 9/02
U.S. Cl. 219—10.79 **11 Claims**



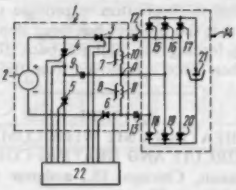
1. Induction heating apparatus comprising a substantially flat high frequency induction heating coil having an elongate configuration with major and minor axes and a generally open center and terminals for electrical connection to a high frequency alternating current generator, and an associated elongate core of substantially non-magnetic, conductive metal disposed generally within the open center of the coil with the major axis of the core substantially aligned at and along the major axis of the coil and insulated from the coil.

4,017,705

IMPULSE CURRENT GENERATOR FOR ELECTROEROSION MACHINING OF METALS

Sergei Nikolaevich Bazhenov, ulitsa Pushkinskaya, 32, kv. 4, and Efim Mordukhovich Belyavsky, ulitsa Tonkopia, 8b, kv. 115, both of Kharkov,, U.S.S.R.

Filed May 14, 1975, Ser. No. 577,546
Int. Cl.² B23P 1/02
U.S. Cl. 219—69 C **2 Claims**



1. An impulse current generator for electroerosion machining of metals comprising: a series inverter; at least one power supply source of said series inverter; controlled rectifiers of said series inverter; a control circuit for said rectifiers connected to said rectifiers; a first choke of said series inverter; a second choke of said series inverter; a winding of said first choke having a first end and a second end; a winding of said second choke having a first end and a second end, the first end being connected to the first end of said winding of said first choke; a storage capacitor of said series inverter connected to said first ends of said windings of said first and second chokes; each said choke winding, said respective controlled rectifiers and said respective one power supply source forming an independent recharge circuit of said storage capacitor; a rectifier circuit electrically coupled to the input of said series inverter and having three input terminals and two output terminals; a first differentiating capacitor providing said electric coupling of the output of said series inverter to said rectifier circuit, said first differentiating capacitor being connected between the second end of said winding of said first choke and said first input terminal of said rectifier circuit so as to form, together with said winding of said first choke, a circuit for shaping pulses of the output current of the generator; and a second

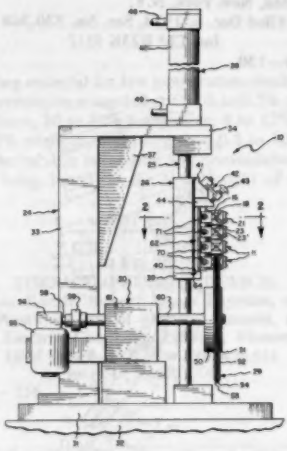
differentiating capacitor providing said electric coupling of the output of said series inverter to said rectifier circuit, said second differentiating capacitor being connected between the second end of said winding of said second choke and said second input terminal of said rectifier circuit so as to form, together with said winding of said second choke, a circuit for shaping the pulses of the output current of the generator, said third input terminal of said rectifier circuit being connected to said first ends of said windings of said first and second chokes, said two output terminals of said rectifier circuit being adapted to be connected to a load, whereby a series of short pulses suitable for electroerosion machining of metals are produced and are all directed in the same direction or have the same polarity.

4,017,706

METHOD OF PROVIDING A TORQUE MOTOR WITH AIR GAPS OF EQUAL LENGTH

Richard A. Aubrecht, East Aurora, and Richard N. Hart, Crittenden, both of N.Y., assignors to Moog Inc., East Aurora, N.Y.

Filed Jan. 12, 1976, Ser. No. 648,284
Int. Cl.² B23P *1/08*
U.S. Cl. 219—69 M **5 Claims**



1. The method of providing a torque motor with air gaps of equal length between an armature interposed between two spaced polepieces, comprising the following steps:

assembling said torque motor so that said armature is positioned between said polepieces, the space between said armature and each of said polepieces defining one of a cooperative pair of starting air gaps;

positioning an electrode having two spaced portions of equal dimension such that said electrode portions are arranged proximate said starting air gaps;

providing a plurality of repetitious pulses of electrical energy to discharge between said electrode and torque motor;

moving said electrode and torque motor relative to one another; and

removing proximate material of said armature and polepieces which is positioned closest to said electrode portions by such electrical discharge;

thereby to provide said torque motor with final air gaps of equal length between said armature and said polepieces.

5. The method of providing a torque motor with final air gaps of equal length between an armature interposed between two spaced polepieces, comprising the following steps:

assembling said torque motor so that said armature is positioned between said polepieces, the space between said armature and each of said polepieces defining one of a cooperative pair of starting air gaps;

positioning such assembled torque motor spaced from a means for removing material from said torque motor without physical contact with said torque motor;

energizing said means to remove material from said armature and polepieces;

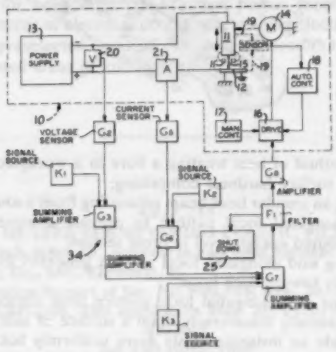
thereby to remove material from said armature and polepieces to provide said final air gaps of equal length without physical contact with said torque motor.

4,017,707

METHOD OF AND MEANS FOR SPACING CONTROL OF PLASMA ARC TORCH

Ronald D. Brown, Morton, and Billy L. Stolin, Mundelein, both of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed Dec. 4, 1974, Ser. No. 529,324
Int. Cl.² B23K *9/10*
U.S. Cl. 219—121 P **8 Claims**



1. The method of automatically maintaining a selected spacing of a plasma arc torch from the work surface of a workpiece comprising the steps of:

a. establishing a plasma arc between said surface and said plasma arc torch at said selected spacing by means of a plasma arc torch power supply;

b. electrically sensing the voltage present between said workpiece and said plasma arch torch and generating a first electrical signal representative thereof with respect to a given ground;

c. electrically sensing the current flow between said workpiece and said plasma arc torch and generating a second electrical signal representative thereof with respect to said given ground;

d. electrically inverting one of said first and second electrical signals with respect to said given ground and electrically summing said inverted signal with a first selected reference signal to produce a first composite signal of given magnitude and sign with respect to said given ground;

e. electrically summing the other of said first and second electrical signals with a second selected reference signal to produce a second composite signal comparable in magnitude and opposite in sign to said first composite signal with respect to said given ground;

f. electrically generating a third selected reference signal equal in magnitude and opposite in sign to the difference between said first and second signals with respect to said given given ground at said selected spacing and summing said third electrical signal with said first and second composite signals to produce an electrical control signal representative of both the sense and the amount of any change in said second signal with respect to said first signal; and

g. applying said electrical control signal to electromechanical means coupled to said plasma arc torch for moving said plasma arc torch toward said selected spacing from said work surface in response to said control signal.

4,017,708

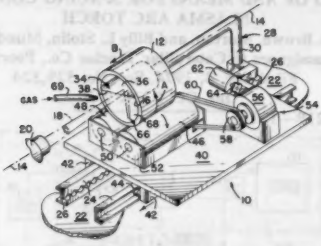
METHOD AND APPARATUS FOR HEAT TREATING AN INTERNAL BORE IN A WORKPIECE

Simon L. Engel, Mountain View, Calif.; Preston L. Gale, East Peoria, and Glenn H. Lenzen, Jr., Peoria, both of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Continuation of Ser. No. 487,913, July 12, 1974, abandoned. This application Feb. 27, 1976, Ser. No. 662,078

Int. Cl.² B23K *26/00*

U.S. Cl. 219—121 LM **7 Claims**



1. A method of heat treating a bore in a workpiece to increase its surface hardness comprising;

shaping an annular laser beam emanating from a source into an elongated focal pattern to provide a more evenly distributed energy level in cross section;

directing said elongated focal pattern generally axially inwardly toward such bore;

reflecting said elongated focal pattern from mirror means substantially transversely upon a surface of said bore to provide an instantaneously more uniformly hot heating zone thereat; and

effecting relative motion between the workpiece and said mirror means so that said bore is progressively scannably heat treated to minimize heating of the entire workpiece.

4,017,709

ARC WELDING MACHINE

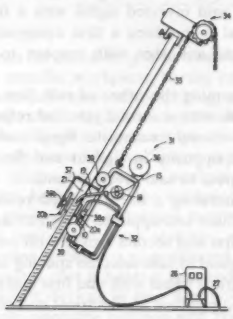
Toshihiko Watanabe, Kamakura, and Tokuji Maruyama, Fujisawa, both of Japan, assignors to Kobe Steel Ltd., Kobe, Japan

Filed Feb. 13, 1975, Ser. No. 549,474

Claims priority, application Japan, Mar. 1, 1974, 49-25024[U]; Mar. 1, 1974, 49-25025[U]; June 26, 1974, 49-75927[U]; Feb. 13, 1974, 49-18004; Feb. 19, 1974, 49-19683; Mar. 3, 1974, 49-25575; Feb. 13, 1974, 49-18005

Int. Cl.² B23K *9/08*

U.S. Cl. 219—126 **9 Claims**



1. An arc welding machine for welding together two members defining a welding groove therebetween, comprising:

strap means adapted to be disposed adjacent said two members and said welding groove;

an electric conductor movably disposed adjacent to said strap and upon the side of said strap means opposite that wherein said welding groove is disposed, said electric conductor being electrically insulated from said strap means;

means for generating an arc within the vicinity of said welding groove;

means for applying an electric current to said electric conductor so as to generate a magnetic field for affecting the direction of said arc; and

means for cooling said electric conductor characterized in that a cooling water passage is disposed centrally of said conductor whereby a high electric current can pass through said electric conductor without enlarging the sectional area thereof so as to facilitate the approach of said electric conductor toward said welding arc so as to affect the same.

4,017,710

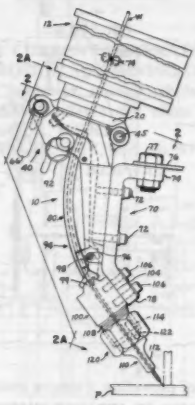
WELDING ASSEMBLY

Elbert D. Watt, East Alton, Ill., assignor to ACF Industries, Incorporated, New York, N.Y.

Filed Dec. 6, 1974, Ser. No. 530,368

Int. Cl.² B23K *9/12*

U.S. Cl. 219—130 **27 Claims**



1. A welding assembly comprising:

a weld head having means associated therewith for directing at least one weld wire generally in the direction of a work piece to be welded;

a nozzle body including a wire guide pivotally mounted about said weld head;

said nozzle body having means in association therewith for pivoting said nozzle body about said weld head;

latch means removably mounting said wire guide upon said nozzle body;

said wire guide having means thereon for further directing said weld wire toward said work piece;

said nozzle body having means thereon adapted to engage electrical current carrying equipment;

a welding tip mounted in operative relation with said wire guide to further direct movement of the weld wire toward said work piece;

and means for maintaining said weld tip in engagement with said welding assembly;

whereby said nozzle body, wire guide and welding tip may be simultaneously pivoted about said weld head to move said welding tip relative to said work piece, and whereby said wire guide can be readily removed from said welding assembly for cleaning and/or replacement thereof.

4,017,711
WELDING MATERIAL FOR LOW TEMPERATURE STEELS

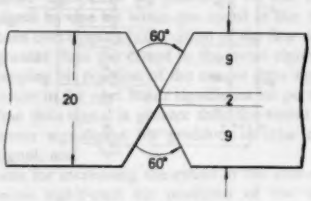
Hiroyuki Honma, Sagamihara; Hirofumi Yoshimura, Kitakyushu; Takeshi Nishi, Machida, and Rokuro Fujimoto, Yokohama, all of Japan, assignors to Nippon Steel Corporation, Tokyo, Japan

Continuation-in-part of Ser. No. 532,228, Dec. 12, 1974, abandoned, which is a continuation of Ser. No. 400,673, Sept. 25, 1973, abandoned. This application Sept. 23, 1975, Ser. No. 616,074

Claims priority, application Japan, Sept. 25, 1972, 47-95895

Int. Cl.² C22C *38/38, 38/58*

U.S. Cl. 219—146 **4 Claims**



1. A welding material for low temperature steels comprising a core wire consisting essentially of 0.05 to 0.5% carbon, 0.15 to 0.75% silicon, 20 to 50% manganese, 4 to 17% chromium, 0.005 to 0.5% nitrogen, and more than 0.5 to 10% molybdenum, with the balance being iron and unavoidable impurities, all weights being based on the total weight of the welding material.

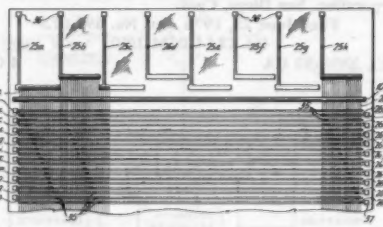
4,017,712
THERMAL PRINTING DEVICE

David Robbin Baraff, Robert James Boynton, and William Dickson Westwood, all of Ottawa, Canada, assignors to Northern Electric Company, Limited, Montreal, Canada

Filed Dec. 8, 1975, Ser. No. 638,611

Int. Cl.² H05B *1/00*

U.S. Cl. 219—216 **12 Claims**



1. A thermal printing device comprising:

a substrate of electrically insulating material;

a continuous bar of electrically resistive material on a surface of said substrate;

a first pattern of electrical conductors on said surface of said substrate and extending along one side of said bar and first electrical connectors extending from said first pattern to said bar, said first electrical connectors connected to said bar at said one side in a closely spaced predetermined arrangement extending along the bar, said first pattern of electrical conductors comprising a plurality of columns, each column electrically separate from other columns, and a plurality of said first electrical connectors extending side by side from each of said columns to said bar of electrically resistive material;

a second pattern of electrical conductors on said surface of said substrate and extending along the other side of said bar, and second electrical connectors from said second pattern to said bar, said second electrical connectors connected to said bar at said other side in a closely spaced predetermined arrangement extending along the bar and opposed to said first electrical connectors, said second pattern of electrical conductors comprising a plurality of rows, each row electrically separate from other rows, and a plurality of said second electrical connectors extending from each of said rows to said bar, each electrical connector from a row connected to said bar opposite a first electrical connector connected to a single different one of said columns, each row connected by said second electrical connectors to said bar at positions different from each other row;

means for connecting an electrical power supply to said patterns of electrical conductors to apply electric current to preselected opposed electrical connectors to produce heated areas in said bar.

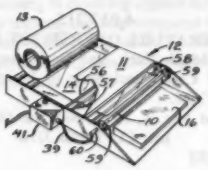
4,017,713
HEATER FOR SEVERING PLASTIC FILM

Frank Lodi, Niles, Ill., assignor to Fast Heat Element Manufacturing Co., Inc., Elmhurst, Ill.

Continuation-in-part of Ser. No. 500,565, Aug. 26, 1974, Pat. No. 3,947,656. This application Mar. 25, 1976, Ser. No. 670,449

Int. Cl.² H05B *1/00*

U.S. Cl. 219—243 **10 Claims**



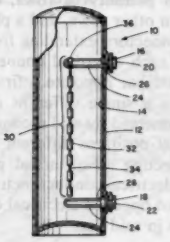
1. An assembly for severing a longitudinally extending web of plastic film meltable at a given temperature and extending relative to a wrapping surface, said assembly consisting of tensioning means for holding said web extended to resist movement of said web responsive to light pressure pull exerted on one end of said web against said tensioning means, a heater assembly adapted to heat sever said web from edge to edge, heater securing means lying outside the severing plane extending from edge to edge of said web for holding said heater in longitudinal alignment with and transverse to the longitudinal axis of said web, said heater assembly comprising an elongated sheath carried by said securing means and adapted to contact said web from edge to edge, dielectric core means substantially coextensive and within said sheath means, a passageway in said dielectric core means, an electric heating element extending through said passageway and secured therein by said core means, a thermal resistance element within said sheath and arranged in surface contact with said sheath and between said sheath and said core means, a circuit connecting said electric heating element and said thermal resistance element with a source of current, and means in said circuit for controlling the flow of current through said circuit to said heating element responsive to said thermal resistance element to maintain said sheath at said given temperature for severing said film at its melting point when said web is brought into contact with said sheath.

4,017,714

SEGMENTED SACRIFICIAL ANODE ATTACHMENT TO WATER HEATING ELEMENT

C. Fred Kreiser, Boca Raton, Fla., assignor to Electro-Therm, Inc., Laurel, Md.

Filed Aug. 4, 1975, Ser. No. 601,900
Int. Cl.² F24H 1/00
U.S. Cl. 219—322 18 Claims



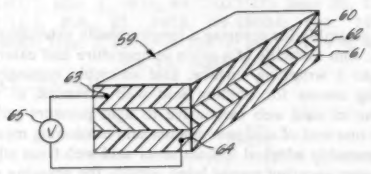
1. A segmented sacrificial anode attachment comprising a chain of discrete metal segments interconnected by a flexible metal conductor and adapted to be inserted through an opening provided in a metal shell of a tank for mounting an electric immersion heater in the tank, said segments being made of a metal which is anodic to the metal shell of the tank, and means for electrically and mechanically connecting one end of said chain of segments to a sheathed leg of an electric immersion heater grounded to the metal shell of the tank.

4,017,715

TEMPERATURE OVERSHOOT HEATER

Wells Whitney, Menlo Park, and David August Horsma, Palo Alto, both of Calif., assignors to Raychem Corporation, Menlo Park, Calif.

Filed Aug. 4, 1975, Ser. No. 601,427
Int. Cl.² H05B 3/10
U.S. Cl. 219—553 40 Claims



1. A self-regulating heating article when connected to a source of electrical current having a layered structure comprising:

a. a layer of electrically conductive material having a positive temperature coefficient of resistance (PTC layer) and an associated switching temperature T_s;

b. an electrical heating layer of constant wattage material (CW layer) having a higher resistance below T_s than does said PTC layer to which it is connected in series;

c. electrical terminal connection for said heating article; and

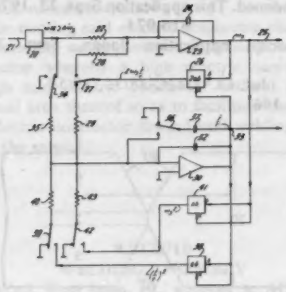
d. means for impeding the temperature increase in said PTC layer relative to said constant wattage layer when electrical connection is made to said source of current so that the PTC layer remains electrically conductive through a least a section of its thickness until the temperature of the CW layer rises above T_s.

4,017,716

METHOD AND APPARATUS FOR DIRECTING AN OBSERVATION MEMBER

Carl Torbern Telling, Lidingo, Sweden, assignor to AGA Aktiebolag, Lidingo, Sweden

Filed Jan. 27, 1976, Ser. No. 652,885
Int. Cl.² G06G 7/80
U.S. Cl. 235—061.5 S 10 Claims



6. In apparatus for tracking an object moving relative thereto, wherein a member is pointed towards said object during a first time interval and a driven member is controlled at the end of said first interval, the improvement comprising means for generating a drive signal for application to said driven member to assist in keeping said driven member pointed towards said object including:

means for generating an orientation signal which is a time function of the orientation of said member;

means operating on said orientation signal for deriving a further signal indicative of the movement of said object; and

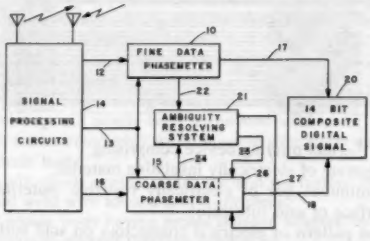
means for combining said orientation signal and said further signal at the end of said first time interval to provide said drive signal.

4,017,717

RESOLUTION OF AMBIGUITIES IN COUNTS CONTAINED IN OVERLAPPING BIT POSITIONS OF FINE AND COARSE DATA MEASUREMENT DIGITAL SIGNALS

Richard Edwin Watt, San Diego, Calif., assignor to Cubic Corporation, San Diego, Calif.

Filed June 25, 1976, Ser. No. 699,673
Int. Cl.² G06M 3/10
U.S. Cl. 235—92 CA 4 Claims



1. In a measuring system wherein a "fine" data signal consisting of a first digital signal providing fine measurement data is combined with an overlapping "coarse" data signal consisting of a second digital signal having more significant bit positions providing coarse measurement data to form a composite digital signal representative of a measured quantity, a system for resolving an ambiguity in the counts contained in overlapping bit positions of the fine data and coarse data signals, comprising

means for comparing the counts in the overlapping bit positions of the fine data and coarse data signals, and

means for adjusting the count in the non-overlapping more significant bit positions of the coarse data signal in accordance with said comparison,

wherein the improvement comprises:

the comparing means comprising

means for comparing the counts in the most significant overlapping bit position of the fine data and coarse data signals, and

means for comparing the counts in the next lesser significant overlapping bit positions of the fine data and coarse data signals; and

the adjusting means comprising

means for reducing the count in the non-overlapping more significant bit positions of the coarse data signal by one bit when the count in the most significant overlapping bit position of the fine data signal is greater than the count in the most significant overlapping bit position of the coarse data signal and the count in the next lesser significant bit positions of the fine data signal is greater than the count in the next lesser significant bit positions of the coarse data signal, and

means for increasing the count in the non-overlapping more significant bit positions of the coarse data signal by one bit when the count in the most significant overlapping bit position of the fine data signal is less than the count in the most significant overlapping bit position of the coarse data signal and the count in the next lesser significant bit positions of the fine data signal is less than the count in the next lesser significant bit positions of the coarse data signal.

4,017,718

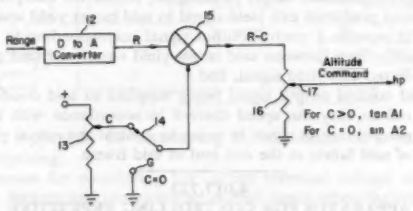
ALTITUDE CONTROL SYSTEM FOR DRONES

Robert John Gerrity, Canoga Park; Clarence Dwight Wandrey, Thousand Oaks, both of Calif., and Benjamin Howard Dolbin, deceased, late of Newbury Park, Calif. (by Arlene M. Dolbin Rossi, executor), assignors to Lear Siegler, Inc., Santa Monica, Calif.

Filed Feb. 9, 1976, Ser. No. 656,703

Int. Cl.² G06G 7/22, 7/78

U.S. Cl. 235—150.2 **2 Claims**



1. A method of providing a vertical profile command signal for a drone at a given slant range R from a target wherein the drone is to decrease in altitude and then make a low altitude horizontal approach when the target range reaches a value C, comprising the steps of:

a. generating a varying analog signal directly proportional to R;

b. generating a constant analog signal directly proportional to C;

c. subtracting C from R to provide a difference signal; and,

d. multiplying said difference signal by a given constant equal to the tangent of the angle of approach of said drone to the point where R=C and by a given constant equal to the sine of the angle of approach of said slant range of said drone to the target when C=O.

4,017,719

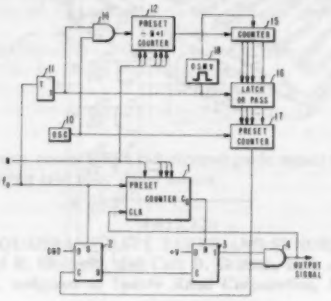
BINARY RATE MULTIPLIER WITH MEANS FOR SPACING OUTPUT SIGNALS

Gerald Stanley Kaplan, Lawrenceville, and Andrew David Ritzie, Delran, both of N.J., assignors to RCA Corporation, New York, N.Y.

Filed Dec. 18, 1975, Ser. No. 642,111

Int. Cl.² G06F 7/39; H03K 5/00

U.S. Cl. 235—150.3 **6 Claims**



1. In a binary rate multiplier for producing N times f_0 output signals, of the type having first input means for receiving signals representing the value of N, second input means for receiving signals at a rate f_0, programmable divide-by-N means preset to said value of N from said first input means by said second input signal means and responsive to said output signals for producing a carry signal after N output signals have been counted, clocking means for producing clocking signals at a rate f_c not less than N_{MAX} times f_0, where N_{MAX} is the maximum value of N, and gating means responsive to said carry signal for passing N clocking signals for each signal from said second input means, the improvement comprising:

clock adjustment means responsive to the N value and to the rate f_0 for adjusting the clock signal rate to approximately (N+1) times f_0.

4,017,720

FOUR QUADRANT ANALOG BY DIGITAL MULTIPLIER

John Mattern, Catonsville, Md., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Dec. 4, 1975, Ser. No. 637,549

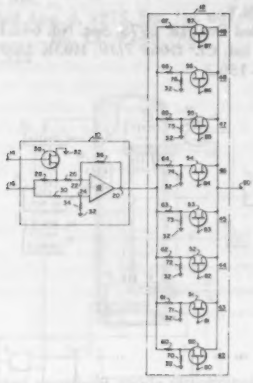
Int. Cl.² G06J 1/00

U.S. Cl. 235—150.52 **16 Claims**

1. Apparatus for the four quadrant multiplication of an analog value by a digital value having a sign plus magnitude binary format comprised of a sign bit and at least one magnitude bit, said apparatus comprising:

an amplifier gain network which provides an output substantially equivalent to the product of said analog value and the sign of said digital value; and

a resistance network responsive to said amplifier network for providing an output substantially equivalent to the



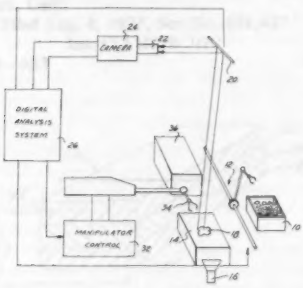
product of the output of said amplifier gain network and the magnitude of said digital value.

4,017,721

METHOD AND APPARATUS FOR DETERMINING THE POSITION OF A BODY

Jimmie A. Michaud, Bellbrook, Ohio, assignor to The Bendix Corporation, Southfield, Mich.

Filed May 16, 1974, Ser. No. 470,345
Int. Cl.² G06F *15/46*; B25J *9/00*
U.S. Cl. 235—151.3 **18 Claims**



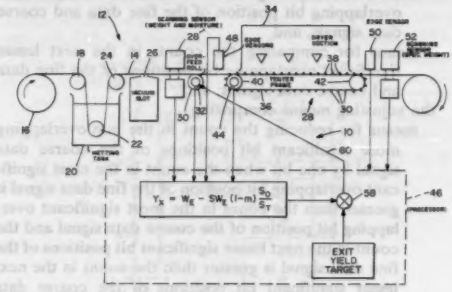
1. A system for generating electrical signals representative of the position of a three-dimensional body relative to a supporting surface, comprising: means for creating an optical image of the silhouette of said body in a first direction; means for receiving the optical image and for generating electrical signals representative of the outline of the body; means for receiving said electrical signals representative of the outline of the body and for generating electrical signals representative of the location of the centroid of the area of the object as viewed from said direction relative to the supporting surface; and means for receiving said electrical signals representative of the outline of the body as viewed from said direction and for generating a signature signal said signature signal being representative of the positions relative to one another of a plurality of positions on the outline of the body, all of said positions having equal displacement from the controid of the body.

4,017,722

CONTROL SYSTEM FOR TEXTILE TENTER FRAME

S. Keith Swanson, Saratoga, Calif., assignor to Measurex Corporation, Cupertino, Calif.

Filed Apr. 11, 1975, Ser. No. 567,108
Int. Cl.² D06C *3/00*
U.S. Cl. 235—151.1 **7 Claims**



1. In combination with a textile tenter frame including a pair of spaced apart belts driven by a drive means and an overfeed roll at the entry end of said frame, and a sheet of fabric entering said frame from a source apparatus for controlling the yield of said fabric at the exit end of said frame comprising:

moisture and weight sensor means at the entrance of said frame measuring the moisture content and source weight of the fabric before entering the tenter frame for producing output signals proportional to the measured moisture content and measured source weight of the fabric before entering the tenter frame;

edge sensor means at opposite edges of said fabric sheet at the entrance of said frame for producing output signals proportional to the width of the fabric before entering the tenter frame;

speed sensor means connected to said belts and to said overfeed roll for producing output signals proportional to the speed of said tenter frame belts and said overfeed roll;

electronic computer control means connected to each of said sensor means and including means for receiving each of said output signals from each of said sensor means, means for repetitively computing a predicted exit yield signal from said output signals, means for generating a predetermined target yield signal, means for comparing said predicted exit yield signal to said target yield source to provide a control output signal corresponding to the difference between said target yield signal and said predicted exit yield signal; and

said control output signal being supplied to said overfeed roll to vary the speed thereof in accordance with said control output signal in order to control the actual yield of said fabric at the exit end of said frame.

4,017,723

APPARATUS FOR CONTROLLING REPETITIVE CUTTING CYCLES ON A WORK PIECE BEING CUT BY A CUTTING TOOL OF A LATHE

Ellwood Donald Fickes, Waynesboro, Va., assignor to General Electric Company, New York, N.Y.

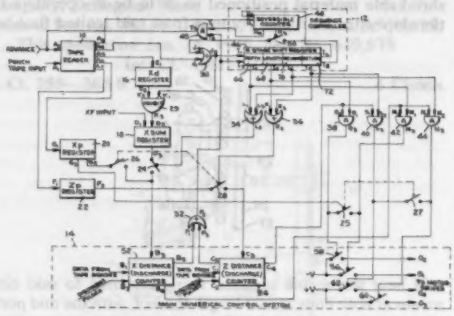
Filed July 25, 1975, Ser. No. 599,229
Int. Cl.² G06F *15/46*; G05B *19/18*
U.S. Cl. 235—151.11 **8 Claims**

1. Apparatus for controlling repetitive cutting cycles on a work piece being cut by a cutting tool of a lathe, comprising:

a. means for storing a plurality of coded signals to control a depth to cut, a length of cut, a removal and a return path for a cutting cycle, and a desired number of identical cutting cycles;

b. means for enabling successive and sequential movement of the cutting tool over a complete cutting cycle of the work piece; and

c. means coupled and responsive to said enabling means for controlling continuation of the cutting of the work piece over additional identical cutting cycles, the number of cutting cycles being predetermined by a coded signal



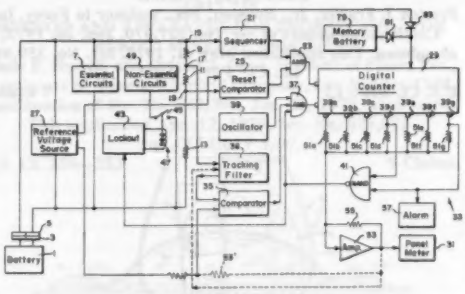
received by said controlling means from said storing means, and the depth of the cut for each cycle being predetermined by a coded signal received by said enabling means from said storing means.

4,017,724

APPARATUS FOR MEASURING BATTERY DEPLETION BY MONITORING REDUCTIONS IN VOLTAGE

Eugene P. Finger, Brewster, N.Y., assignor to Curtis Instruments, Inc., Mount Kisco, N.Y.

Filed June 27, 1975, Ser. No. 591,055
Int. Cl.² G01R 13/02
U.S. Cl. 235—151.31 **9 Claims**



1. Apparatus for monitoring the condition of a battery comprising:

means for monitoring the output terminal voltage of the battery and producing an output signal when the magnitude of the terminal voltage is less than a threshold value;

a stepping motor for integrating said output signal; and

indicator means driven by said stepping motor for indicating the integral stored in said stepping motor.

4,017,725

SOLAR POWERED PORTABLE CALCULATOR

Stephen A. Roen, New York, N.Y., assignor to Litton Business Systems, Inc., Morris Plains, N.J.

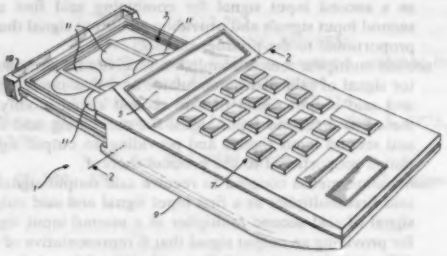
Filed Jan. 3, 1975, Ser. No. 538,308
Int. Cl.² G06F 15/30; H01V 1/30
U.S. Cl. 235—152 **7 Claims**

1. A portable calculator comprising:

a housing having a keyboard and indicator means thereon;

solar panel means; and

means for allowing movement of said solar panel means, coupled to said housing, from a first position within said housing to a second position exposing said solar panel



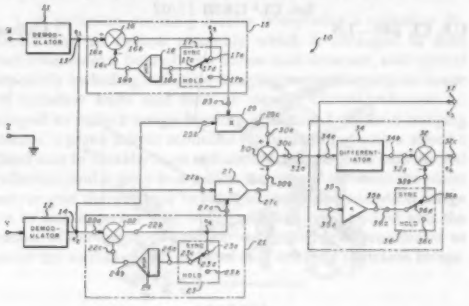
means, comprising a rail-channel guide means for slidably moving said solar panel means.

4,017,726

FOUR QUADRANT RATE TAKER AND SYNCHRONIZER

Edmund R. Skutecki, and Carl D. Griffith, both of Phoenix, Ariz., assignors to Sperry Rand Corporation, New York, N.Y.

Filed Nov. 5, 1975, Ser. No. 629,473
Int. Cl.² G06G 7/22
U.S. Cl. 235—186 **4 Claims**



1. An apparatus for extracting signals representative of an angular variable, ωt, and the time rate of change, ω, thereof from three phase synchro generated signals which are modulated by data signals defining said angular variable and said time rate of change comprising:

three terminal input means coupled to receive said three phase synchro generated signals for developing first and second signals modulated by data signals with modulation of the form sin $(\omega t + \theta)$ and sin $(\omega t - \theta)$;

first and second demodulator means coupled to receive said first and second data modulated signals respectively, for providing demodulated signals proportional to sin $(\omega t + \theta)$ and sin $(\omega t - \theta)$,

first and second signal modifying means responsive to said demodulated signals from said first and second demodulator means respectively for providing an output signal which is representative of the derivative with respect to time of said demodulator signal including:

an integrator having an input means and an output means providing a signal at said output means that is representative of the integration with respect to time of a signal at said input means,

combining means coupled to said demodulated signal of said demodulator as a first input signal and said output signal of said integrator as a second input signal for providing an output signal proportional to the difference between said first and second input signals, said output signal coupled to said input terminal of said integrator and providing said output signal of said signal modifying means;

first multiplier means coupled to receive said demodulated signal from said second demodulator as a first input signal and said output signal of said first signal modifying means as a second input signal for combining said first and second input signals and providing an output signal that is proportional to the product thereof;

second multiplier means coupled to receive said demodulator signal of said first demodulator as a first input signal and said output signal of said second signal modifying means as a second input signal for combining said first and second input signals and providing an output signal that is proportional to the product thereof;

summation means coupled to receive said output signal of said first multiplier as a first input signal and said output signal of said second multiplier as a second input signal for providing an output signal that is representative of the difference between said first and second input signals; and

operational means responsive to said output signal of said summation means for performing mathematical operations on said output signal from said summation means whereby a signal proportional to the time rate of change of said variable is provided.

4,017,727

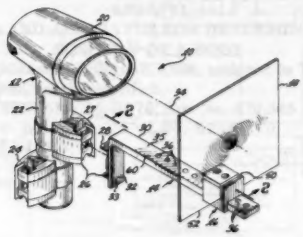
LIGHT PROJECTING APPARATUS

David J. Yamamoto, 4420 W. Vogel, Glendale, Ariz. 85301

Filed Nov. 12, 1975, Ser. No. 631,106

Int. Cl.² G03B *15/02*

U.S. Cl. 240—1.3 **7 Claims**



1. A light projecting apparatus comprising:

a. a photo flash unit having a light emitting structure from which an elongated body perpendicularly depends;

b. an elongated bar one end of which is demountably attached to the elongated body of said photo flash unit, said elongated bar positioned below and extending substantially parallel with the light beam path producable by said photo flash unit;

c. a clamping head carried on said elongated bar; and

d. a fresnel lens demountably attached to said clamping head and extending therefrom into the light beam path producable by said photo flash unit to substantially coincide with the light beam axis.

4,017,728

MULTILAMP PHOTOFLASH UNIT HAVING RADIANT-ENERGY-ACTIVATED QUICK-DISCONNECT SWITCH

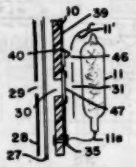
Emery G. Audesse; William T Colville; John W. Shaffer, and David W. Mecone, all of Williamsport, Pa., assignors to GTE Sylvania Incorporated, Montoursville, Pa.

Filed Sept. 17, 1975, Ser. No. 614,108

Int. Cl.² G03B *15/02*; **F21K** *5/02*

U.S. Cl. 240—1.3 **24 Claims**

1. In a multilamp photoflash unit containing a plurality of flashlamps and circuit means for sequentially igniting said flashlamps, at least one radiant-energy-activated quick-disconnect switch included in said circuit means, said disconnect switch being electrically connected in series with one of said flashlamps for interrupting the ignition circuit means for said flashlamp after said flashlamp is ignited, said disconnect switch comprising a length of electrically conductive, heat shrinkable material positioned so as to be in operative relationship with the radiant output from said ignited flashlamp,



said heat shrinkable material being attached to said circuit means at both ends of said length thereof, with the mid portion of said length of heat shrinkable material being spatially suspended to avoid substantial thermal contact with heat absorbing surfaces and thereby maximize the speed with which the shrinking and separation of said mid portion occurs upon its being heated by the radiant output of said ignited flashlamp.

4,017,729

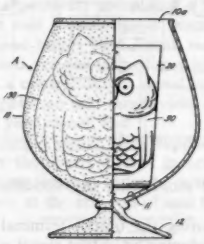
DECORATIVE LAMP

Preston J. Frazier, Jr., Houston, Tex., assignor to Faroy, Inc.

Continuation-in-part of Ser. No. 327,070, Jan. 26, 1973, abandoned. This application May 11, 1973, Ser. No. 359,494

Int. Cl.² F21V *35/00*

U.S. Cl. 240—13 **7 Claims**



1. A decorative lamp, comprising:

an outer shell having a substantially cylindrical surface, a bottom, and an open upper end;

an inner non-rotating candleholder disposed in a selected seated position in said outer shell for holding a candle;

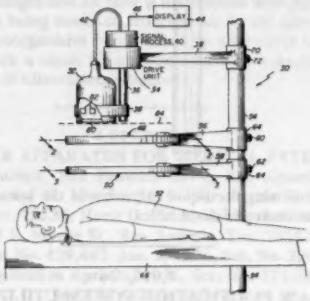
the external surface of said candleholder having a design through which light may pass from a candle in said candleholder; and

said external surface of said candleholder being spaced from said substantially cylindrical surface for the projection of an image of said design onto said outer shell from a candle in said candleholder so that it is visible from externally of said outer shell and so that the image thereof flickers to give the effect of movement of the design by reason of candlelight from a candle in the candleholder flickers.

4,017,730
RADIOGRAPHIC IMAGING SYSTEM FOR HIGH ENERGY RADIATION

Harrison H. Barrett, Lexington, Mass., assignor to Raytheon Company, Lexington, Mass.

Division of Ser. No. 465,940, May 1, 1974, Pat. No. 3,936,639.
This application Jan. 16, 1976, Ser. No. 649,878
Int. Cl.² G01T 1/166
U.S. Cl. 250—363 S 6 Claims

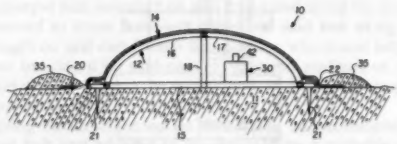


1. A radiographic scanning system comprising:
a camera responsive to incident radiation propagating thereto from a subject;
a mask interposed between said subject and said camera said mask having an elongated region transparent to said radiation and having a predetermined shape;
means coupled to said camera for displaying an image of said subject; and
means for moving said camera along said elongated region.

4,017,731
METHOD AND APPARATUS FOR PROSPECTING FOR BURIED MINERAL DEPOSITS

Eddie P. Howell, and Orland J. Gant, Jr., both of Plano, Tex., assignors to Atlantic Richfield Company, Los Angeles, Calif.

Continuation of Ser. No. 542,309, Jan. 20, 1975, abandoned.
This application Apr. 12, 1976, Ser. No. 675,872
Int. Cl.² G01V 5/00
U.S. Cl. 250—253 9 Claims

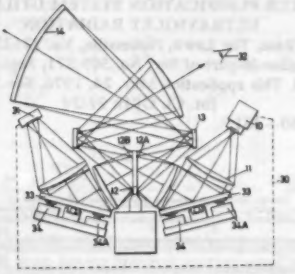


1. The method of detection of the presence of soil gases which migrate upwardly through the earth's structure comprising the steps of:
a. enclosing respective air spaces above each of a plurality of predetermined spaced apart areas at the surface of the earth in a location of interest so that said soil gases exiting into the atmosphere over said surface areas are confined within said respective air spaces and so that external atmospheric contaminants are excluded from entry therewithin;
b. employing a like plurality of shelters for enclosing said respective air spaces, each such shelter comprising a material which is highly permeable to infrared radiation, so that said surface areas are exposed to said radiation with sufficient intensity to raise significantly the temperature of the subsoil therebeneath and thus in turn to increase the rate of escape of said soil gases from the earth; and
c. measuring the level of concentration of said soil gases within said air spaces.

4,017,732
RADIATION SCANNING SYSTEM

Herbert Morrison Runciman, Glasgow, Scotland, assignor to Barr and Stroud Limited, Glasgow, Scotland

Filed Jan. 7, 1976, Ser. No. 647,116
Claims priority, application United Kingdom, Feb. 5, 1975, 4843/75
Int. Cl.² H01J 31/49
U.S. Cl. 250—334 7 Claims

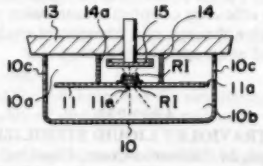


1. A radiation scanning system comprising a radiation detector and an optical assembly which is arranged to scan radiation from a field of view across said detector, said optical assembly including radiation-imaging means forming an image of radiation from said field of view, a curved reflector arranged to reflect image-forming radiation from said imaging means, a plane mirror mounted for oscillatory motion about a fixed axis to thereby scan radiation reflected from said curved reflector, and a relay lens means interposed between the plane mirror and the detector to relay said scanned radiation image on to said detector and, in the plane normal to said axis the radius of curvature of said curved reflector approximates to twice the radius of curvature of said scanned radiation image.

4,017,733
IONIZATION TYPE SMOKE SENSOR

Kanji Ishii, and Haruyoshi Sato, both of Tokyo, Japan, assignors to Hochiki Corporation, Tokyo, Japan

Filed Apr. 17, 1975, Ser. No. 568,969
Claims priority, application Japan, Apr. 18, 1974, 49-44089[U]; Dec. 12, 1974, 49-141990
Int. Cl.² G01T 1/18; H01J 39/28
U.S. Cl. 250—381 7 Claims



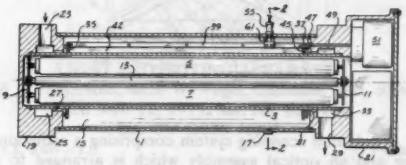
1. A smoke sensor of the ionization type comprising a first metal electrode member having a cup-shaped configuration and provided with air inlet means for permitting an air current to flow into the inner space of said first electrode member, a second metal electrode arranged within said first cup-shaped, electrode member and defining within the latter an upper section and a lower section thereof, said air current flowing into said upper section through said air inlet means and circulating in said upper section before flowing into said lower section, a flow regulating means provided within said upper

section and serving at least to change the direction of the air current in said upper section, a radioactive ray source carried by said second electrode member so as to radiate in said lower section, said second electrode member having opening means therethrough to permit the inflowing air current to flow from said upper section into said lower section, whereby the formation of dew is preferentially caused within said upper section and the heat retained by the inflowing air current is transferred to said second electrode member carrying said radioactive ray source such that the temperature of the second electrode member approaches that of said inflowing air current.

4,017,734
WATER PURIFICATION SYSTEM UTILIZING ULTRAVIOLET RADIATION

Henry M. Ross, The Lawn, Nokesville, Va. 22123

Continuation-in-part of Ser. No. 509,871, Sept. 27, 1974, abandoned. This application Mar. 24, 1976, Ser. No. 669,767
Int. Cl. G01n *21/24*
U.S. Cl. 250—431 **7 Claims**



1. A water purification system utilizing ultraviolet radiation comprising

an elongated outer enclosure having an inlet and an outlet for the passage of water,

a transparent cylindrical enclosure mounted coextensively within said outer enclosure to define a passageway for water therebetween,

ultraviolet radiation means mounted within said transparent cylindrical enclosure,

first and second annular members mounted for rotation at opposite ends of said transparent cylindrical enclosure,

a plurality of metallic wiper blades extending parallel to the longitudinal axes of said cylindrical enclosures and connected between said first and second annular members within said passageway in position to have an edge portion in wiping contact with the outer surface of said transparent cylindrical enclosure, and

means to operate said wiper blades around said transparent enclosure to continually remove sediment and impurities deposited on the surface by the water passing through said passageway, said means to operate said wiper blades comprising a drive motor coupled to one of said annular members,

whereby the efficiency of optical transmission of the ultraviolet radiation through said transparent enclosure will be maintained at an optimum value.

4,017,735
ULTRAVIOLET LIQUID STERILIZER

Arthur D. Siegel, 24 Goldenrod Court, Cheshire, Conn. 06410

Filed Oct. 24, 1975, Ser. No. 625,557
Int. Cl.² E04H *3/16*, *3/20*; G01N *21/24*, *23/12*
U.S. Cl. 250—430 **4 Claims**

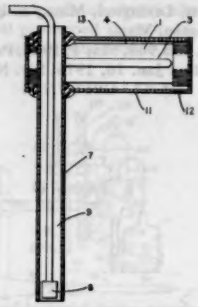
1. a liquid sterilizer which comprises:

a. an enclosure;

b. an ultraviolet germicidal lamp suspended in the upper portion of said enclosure;

c. A lower wall of said enclosure exposed to the radiation from the lamp said lower wall having at least one drain hole (and) the upper rim of said drain hole flush with the upper surface of the lower wall; and

d. a means to deliver turbulent, aerated liquid to said lower

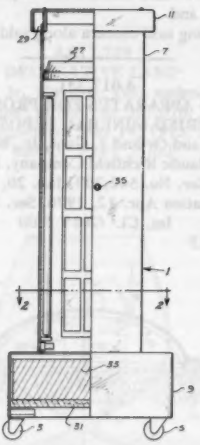


wall causing the liquid to pass over the lower wall and to drain from the drain holes.

4,017,736
AIR PURIFICATION SYSTEM UTILIZING ULTRAVIOLET RADIATION

Henry M. Ross, The Lawn, Nokesville, Va. 22123

Continuation-in-part of Ser. No. 509,885, Sept. 27, 1974, abandoned. This application Mar. 24, 1976, Ser. No. 669,766
Int. Cl. G01n *21/24*
U.S. Cl. 250—435 **1 Claim**



1. A portable air purification system utilizing ultraviolet radiation comprising

an upstanding elongated metallic enclosure having a lower inlet and an upper outlet for the passage of air.

fan means mounted within said enclosure between the inlet and outlet to cause the movement of air therebetween,

a metallic cap member mounted over said outlet,

said cap member having downturned edges spaced from said elongated enclosure to form an air passageway directing the flow of air downwardly,

a base member comprising a hollow metallic enclosure mounted on casters, said base member being joined to said upstanding enclosure at the inlet end thereof,

filter means positioned within said base member to remove particles of impurities contained in the air passing therethrough,

said filter means comprising a metallic mesh pre-filter and a sub-micron laminar flow cell,

said sub-micron laminar flow cell being constructed of fiberglass and paper with a porosity sufficiently small to cause particles with diameters larger than 0.3 microns to be trapped by said flow cell,

a plurality of high intensity ultraviolet tubes vertically mounted within said enclosure in position to expose all air passing therethrough to ultraviolet radiation,

a peep-hole provided with optical filter means positioned in said elongated enclosure to enable inspection of said ultraviolet tubes while in operation,

whereby straight-line air flow is maintained with particulate materials being removed from the air by the filter means and microorganisms being killed by ultraviolet radiation to produce a clean air environment with complete suppression of ultraviolet radiation.

4,017,737

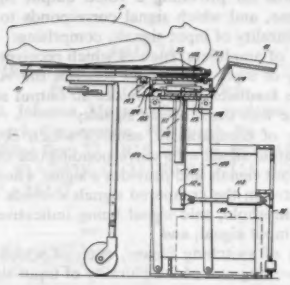
CONVEYER APPARATUS FOR MEDICAL PATIENTS

Donald C. Hudson, 502 Fenwick Drive, San Antonio, Tex. 78329; Charles R. Morris, 3119 War Arrow Drive, San Antonio, Tex. 78238; Horst G. Fleck, and Karl A. Senghaas, both of 818 E. Myrtle St., San Antonio, Tex. 78212

Division of Ser. No. 429,482, Jan. 2, 1974, Pat. No. 3,908,126. This application Apr. 24, 1975, Ser. No. 571,266

Int. Cl.² G21K *5/08*

U.S. Cl. 250—453 **3 Claims**



1. A conveyor cart for aiding in the placement of a subject to be x-rayed or treated in position in a radiographic apparatus, comprising, in combination:

an elongated frame;

a conveyor belt mounted on said frame and along the length thereof to move a subject placed on said belt along the length on said cart from a first position where said subject can be placed on said cart to a second position on said cart where he can be positioned in said radiographic apparatus; and

coupling means mounted on said frame and connected to said belt and adapted to be actuated by a movable element in said radiograhic apparatus for moving said belt, and means connected between said coupling means and said conveyor belt for amplifying the motion of such a movable element to cause a greater movement of said belt in response thereto.

4,017,738

SCINTILLATOR

Mark Hyman, Jr., 62 Woodbine Road, Belmont, Mass. 02178

Division of Ser. No. 483,317, June 26, 1974, Pat. No. 3,951,847. This application June 17, 1975, Ser. No. 587,542

Int. Cl.² G01J *1/58*

U.S. Cl. 250—483 **5 Claims**

1. A method of detecting and measuring emission of high energy particles comprising exposing to high energy particles a measured solution containing 2,5-di-m-tolyl-1,3,4 oxadiazole and measuring the emission of radiation from the 2,5-di-m-tolyl-1,3,4 oxadiazole.

4,017,739

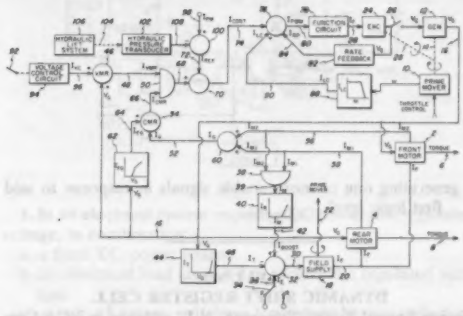
LIFTING FORCE RESPONSIVE LOAD CONTROL FOR ELECTRICALLY PROPELLED EARTHMOVING VEHICLES

Martin Jay Hapeman, Edinboro, and Barry Jay Turley, Erie, both of Pa., assignors to General Electric Company, Erie, Pa.

Filed Feb. 27, 1975, Ser. No. 553,864

Int. Cl.² B60L *3/06*

U.S. Cl. 290—14 **6 Claims**



1. For use in an electrically propelled earthmoving traction vehicle of the type having integral earthmoving means for penetrating, lifting, transporting, and discharging earth matter and wherein prime mover means drives electric generating means supplying electrical energy to traction motor means, said prime mover means also being adapted to supply power to means for operating said earthmoving means, a propulsion control system for limiting the electrical output of said generating means responsive to the available output of said prime mover, said propulsion control system comprising:

a. a source of feedback signals varying as functions of the electrical output of said generating means;

b. a source of reference signals representative of the available power output level of said prime mover;

c. comparison means responsive to said feedback and reference signals and having an output adapted to provide a control signal for limiting the output of said generating means;

d. means for deriving a lifting force signal representative of a lifting force applied to said earthmoving means; and

e. means responsive to said lifting force signal for modifying said control signal to reduce the output limit of said generating means and thereby to reduce maximum available tractive effort.

4,017,740

SYNCHRONIZATION OF DIGITAL CIRCUITS BY BUS TRIGGERING

William A. Farnbach, and Charles T. Small, both of Colorado Springs, Colo., assignors to Hewlett-Packard Company, Palo Alto, Calif.

Filed Apr. 30, 1975, Ser. No. 573,298

Int. Cl.² H03K *19/08, 5/13*

U.S. Cl. 307—208 **6 Claims**

1. A method for synchronizing the simultaneous interrogation of a plurality of digital circuits, said method comprising the steps of:

detecting a first logical state within a first digital circuit; said first digital circuit being responsive to first clock signals;

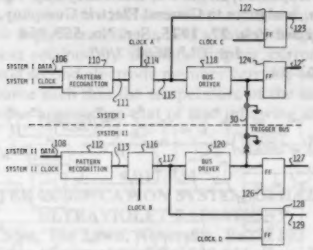
detecting a second logical state within a second digital circuit; said second digital circuit operating asynchronously with respect to said first digital circuit and not being responsive to said first clock signals nor to phase or harmonically related components derived therefrom;

providing a first logic level to an electrical signal line in response to the detection of said first logic state;

providing a first logic level to said electrical signal line in response to the detection of said second logic state;

inhibiting the production of said first logic level and provid-

ing a second logic level to said electrical signal line if said first and second logic states are not detected simultaneously; and

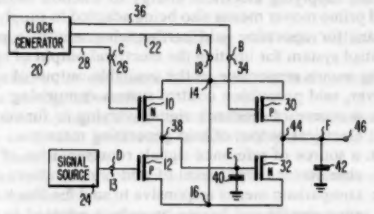


generating one or more enable signals in response to said first logic level.

4,017,741
DYNAMIC SHIFT REGISTER CELL

George Roland Briggs, Princeton, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Nov. 13, 1975, Ser. No. 631,458
Int. Cl.² G11C *19/28, 19/18;* H03K *23/26, 17/60*
U.S. Cl. 307—221 C 12 Claims



1. An integrated circuit dynamic shift register stage having an input and output terminal comprising, in combination:

first, second and third terminals to which respective control voltages may be applied;

first and second charge storage means coupled between a first node and a point at a reference potential and a second node and said point at said reference potential, respectively, said second node comprising said output terminal;

a first metal-oxide-semiconductor (MOS) transistor of a first conductivity type having a conduction path and a control electrode, said conduction path connected between said first node and said first terminal and said control electrode comprising said input terminal;

a second MOS transistor of a second conductivity type having a conduction path and a control electrode, said second transistor conduction path connected in parallel connection with said first transistor conduction path and said second transistor control electrode connected to said second terminal;

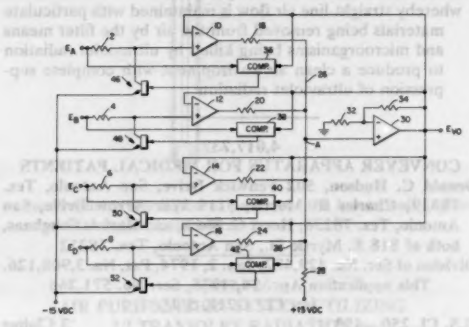
a third MOS transistor of said second conductivity type having a conduction path and a control electrode, said third transistor conduction path connected between said second node and said first terminal and said third transistor control electrode connected to said first node; and

a fourth MOS transistor of said first conductivity type having a conduction path and a control electrode, said fourth transistor conduction path connected in parallel connection with said third transistor conduction path and said fourth transistor control electrode connected to said third terminal.

4,017,742
MULTIPLE INPUT, MULTIPLE FAILURE OPERATIONAL VOTER CIRCUIT

Robert L. James, Bloomfield, N.J., assignor to The Bendix Corporation, Teterboro, N.J.

Filed Mar. 28, 1975, Ser. No. 563,260
Int. Cl.² H03K *5/20*
U.S. Cl. 307—357 9 Claims



1. Apparatus for providing a voted output signal at any instant in time, and which signal corresponds to a selected signal of a plurality of input signals, comprising:

a plurality of amplifiers, each of which receives one of the plurality of input signals and receives the voted output signal as feedback, and provides an output signal in accordance with the received signals;

a plurality of comparators, each of which compares the voted output signal wit a corresponding one of the plurality of input signals and provides a signal when the difference between the compared signals exceeds a predetermined threshold, said signal being indicative of an unwanted input signal; and

a plurality of switching means, each of which receives a corresponding one of the plurality of input signals and is connected to a corresponding comparator and to a maximum fixed signal level means, and is responsive to the comparator signal indicative of an unwanted signal for switching the unwanted input signal to the maximum fixed signal level.

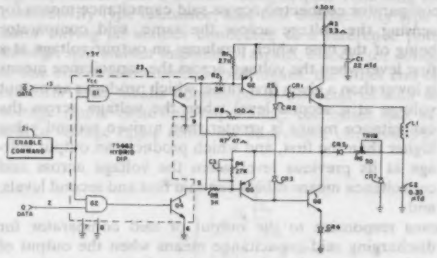
4,017,743
ELIMINATION OF CROSSTALK IN TWO SEQUENTIALLY OPERATED DARLINGTON AMPLIFIER CHANNELS

Clyde E. Hartman, Huntsville, Ala., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Sept. 26, 1975, Ser. No. 617,213
Int. Cl.² H03K *17/16, 17/56*
U.S. Cl. 307—237 4 Claims

1. In a system having first and second sequentially operated amplifier channels each having a channel input and a channel output, the improvement comprising first clamping means connected between the first channel and said second channel so that when said first channel is in an on condition said second channel is clamped to an off condition; second clamping means connected between said second channel and said first channel such that when said second channel is in an on condition said first channel is clamped to an off condition; said first and second amplifier channels consists of a plurality of cascaded connected amplifiers each having a signal input terminal and a current output path; the input terminal of one amplifier of each channel being connected to said channel input; a current path of another amplifier of each channel being connected to said channel output; said first clamping means being

a first diode connected between a signal input terminal of an amplifier in said second channel and a current path of an amplifier in said first channel; and said second clamping



means being a second diode connected between a signal input terminal of an amplifier in said first channel and a current path of an amplifier in said second channel.

4,017,744

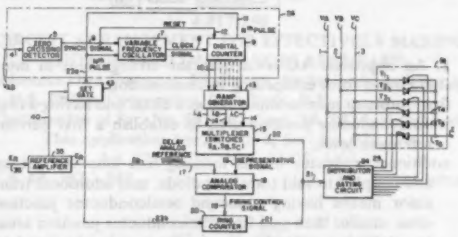
DIGITAL FIRING PULSE GENERATOR FOR THYRISTOR POWER CONVERTERS

Frederick O. Johnson, Monroeville, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Dec. 22, 1975, Ser. No. 642,814

Int. Cl.² H03K *17/72;* **H02M** *7/155, 5/257*

U.S. Cl. 307—252 Q **3 Claims**



1. Digital firing pulse generator for generating and applying firing pulses to a plurality of controlled rectifiers connected as a polyphase arrangement in an alternating current power supply comprising:

first counter means synchronized with the power supply for generating a plurality of timing waveforms related to respective phases of said power supply;

comparator means for comparing one of said timing waveforms with a reference signal for generating a control signal defining a firing angle for the next controlled rectifier to be fired;

ring counter means responsive to said control signal for providing a logic representation of said next controlled rectifier;

gating means responsive to said ring counter means for selecting said next controlled rectifier and for firing the same; and

multiplexer means interposed between said first counter means and said comparator means for selecting said one timing waveform, said ring counter means controlling said multiplexer means to select as said one timing waveform a timing waveform corresponding to the phase associated with said next controlled rectifier.

4,017,745

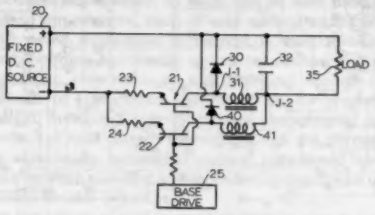
SWITCHING REGULATOR POWER SUPPLY

William Henry McMahon, Salt Lake City, Utah, assignor to American Laser Corporation, Salt Lake City, Utah

Filed Feb. 11, 1976, Ser. No. 657,157

Int. Cl.² H03K *17/60*

U.S. Cl. 307—254 **9 Claims**



1. In an electrical system requiring DC power at a regulated voltage, in combination:

a. a fixed DC power source;

b. an electrical load arranged to receive the regulated voltage;

c. a pair of power switching transistors having collector, base and emitter connections and connected in parallel between said source and said load;

d. base drive means connected to the respective base connections of said transistor;

e. a pair of inductive type filters each being connected on one side to a common junction which in turn is connected to a first side of said electrical load with the other respective side of each said filter being connected to a respective selected one of said emitter and collector connections such that each said transistor provides current to said load through a separate said filter; and

f. a pair of flyback diodes, said diodes being connected on one side to a common line which in turn is connected to a second side of said load and said diodes on their respective opposite sides having a respective connection to the selected one of said emitter and collector connections of a respective transistor to which a respective filter is connected and in a manner enabling the respective currents carried by each of said transistors to be equalized during the rise and fall times of the switching cycle of said regulator circuit and each respective flyback diode to conduct the current generated by the respective filter with which it is associated during the time when the respective associated transistor is not conducting.

4,017,746

TIMING CIRCUIT MEANS

Gerald K. Miller, Hersey, Mich., assignor to Nartron Corporation, Reed City, Mich.

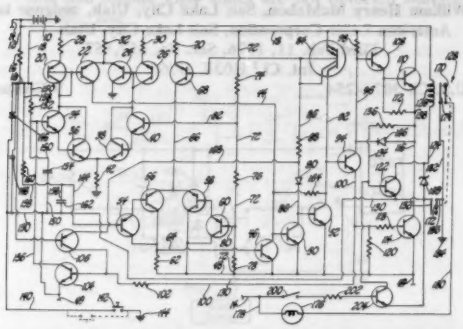
Filed July 18, 1975, Ser. No. 597,161

Int. Cl.² H03K *5/13;* **G01R** *29/02;* **H01H** *47/32*

U.S. Cl. 307—293 **9 Claims**

1. A timing circuit, comprising first switch means operable into first and second operating modes, circuit means including second switch means responsive to said first switch means being in its second operating mode to concurrently energize associated electrical relay switch means and electrical load means, said curcuit means further comprising means for conditioning said second switch means to de-energize said electrical load a predetermined time period subsequent to and independently of operation of said first switch means in said second operating mode, and third switch means having at least

two modes of operation, said third switch means when in one of its said two modes being effective to de-energize said electrical relay switch means and said electrical load means within a time span less than said predetermined time period.

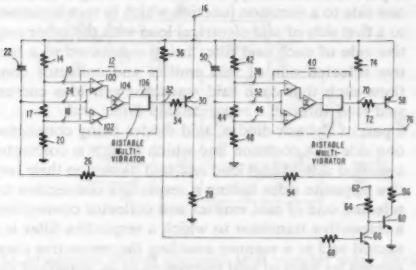


4,017,747

FIRST TIMING CIRCUIT CONTROLLED BY A SECOND TIMING CIRCUIT FOR GENERATING LONG TIMING INTERVALS

Abel Ching Nam Sheng, Westport, Conn., assignor to RCA Corporation, New York, N.Y.

Filed Nov. 17, 1975, Ser. No. 632,814
Int. Cl.² H03K 5/13, 17/26
U.S. Cl. 307—293 **9 Claims**



1. A timing circuit comprising, in combination:
first and second charge store means:
first and second comparators, each of the type having two reference voltage input levels, one relatively high and the other relatively low, and a signal voltage input terminal, and each for producing an output signal at a first level when the input signal present at said input terminal is higher than said high reference level, for producing an output signal at a second level when said input signal is lower than said low reference level, and for producing an output signal which remains at its previous value, either first or second, when said input signal is between said high and low levels, said first comparator connected at its signal input terminal to one terminal of said first charge storage means for sensing the voltage present there and said second comparator connected at its signal input terminal to one terminal of said second charge storage means for sensing the voltage present there;
means responsive to the output signal of said first comparator for charging said first charge storage means when said output signal is at one level and discharging the same when said output signal is at its other level; and
means for charging the second charge storage means, during the time said first charge storage means is discharging, when the output of said second comparator is at one level, and responsive to the output signal of said second comparator when at its other level, for discharging said second charge storage means.

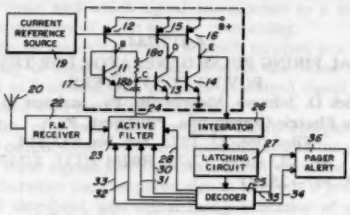
9. In combination:
means for producing a train of pulses of relatively short duration compared to the pulse period;
capacitance means;
means responsive to each pulse for charging said capacitance means during the pulse interval;
a comparator connected across said capacitance means for sensing the voltage across the same, said comparator being of the type which produces an output voltage at a first level when the voltage across the capacitance means is lower than a given first value, which produces an output voltage at a second level when the voltage across the capacitance means is greater than a given second value higher than the first, and which produces an output voltage at its previous level when the voltage across said capacitance means is between said first and second levels; and
means responsive to the output of said comparator for discharging said capacitance means when the output of said comparator is at its second level.

4,017,748

MONOLITHIC AC LEVEL DETECTOR

Walter Lee Davis, Plantation, Fla., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Dec. 29, 1975, Ser. No. 644,995
Int. Cl.² H03K 1/12; H03F 3/04
U.S. Cl. 307—296 R **8 Claims**



1. An improved AC level detector arrangement in integrated circuit form comprising in combination;
first transistor means connected as a diode and having a first semiconductor junction area to establish a first current reference level;
additional transistor means forming first amplifier means and coupled to said transistor diode, said additional transistor means having a second semiconductor junction area, smaller than said first semiconductor junction area, to establish a second current reference level related to said first current reference level by the ratio of the respective junction area thereof;
second amplifier means coupled to the first amplifier means and having its conductivity controlled by a portion of said second reference current; and
means coupled to the first amplifier means for applying an input signal to vary the current of said first amplifier means around the second reference level, whereby a predetermined level of input signal will effect cutoff of said second amplifier means and produce a voltage output pulse from said second amplifier means.

4,017,749

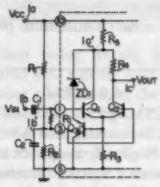
TRANSISTOR CIRCUIT INCLUDING SOURCE VOLTAGE RIPPLE REMOVAL

Kunio Seki; Yukio Suzuki, both of Tokyo, and Yoshio Sakamoto, Kokubunji, all of Japan, assignors to Hitachi, Ltd., Japan

Filed Mar. 23, 1976, Ser. No. 669,699
Claims priority, application Japan, Oct. 6, 1975, 50-119764
Int. Cl.² H03K 17/00
U.S. Cl. 307—296 R **16 Claims**

1. A transistor circuit comprising a source voltage supply

terminal, a first conductivity type transistor, collector load means, emitter impedance means for said first conductivity type transistor, first voltage dividing biasing means, second voltage dividing biasing means, a source voltage ripple removing impedance, and a source voltage ripple removing second conductivity type transistor, said first conductivity type transistor having an emitter connected to a reference potential through said emitter impedance means, a collector connected to one end of said collector load means, the other end of said collector load means connected to one end of said source voltage ripple removing impedance, the other end of said source voltage ripple removing impedance connected to said



source voltage supply terminal, said first and second voltage dividing biasing means connected in series to each other between said source voltage supply terminal and the reference potential, the biasing voltage for the base-emitter junction of said first conductivity type transistor set by the voltage generated at an interconnection point between said first and second voltage dividing biasing means, and said source voltage removing second conductivity type transistor having an emitter connected to the interconnection point of said collector load means and said source voltage ripple removing impedance, a base to the emitter of said first conductivity type transistor, and a collector to the reference potential.

4,017,750

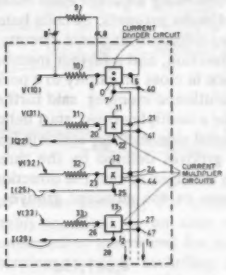
CIRCUIT ARRANGEMENT FOR EFFECTIVELY MAKING INTEGRATED IMPEDANCES ACCURATE

Johannes Otto Voorman, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Continuation of Ser. No. 507,367, Sept. 18, 1974, abandoned. This application Apr. 8, 1976, Ser. No. 675,176

Int. Cl.² H03K *3/26, 23/08, 1/00*

U.S. Cl. 307—303 **6 Claims**



1. A circuit arrangement, comprising:

a first impedance;

a plurality of second impedances, said first and plurality of second impedances having accurately predetermined impedance ratios with respect to each other but inaccurately determined absolute impedance values;

means for electrically connecting one end of said first impedance to a source of constant potential;

a precision impedance electrically connected at one end thereof to said one end of said first impedance;

a current divider circuit electrically connected between the other end of said first impedance and the other end of said precision impedance for producing first and second output currents having the same ratio as the impedance ratio between said first impedance and said precision impedance;

a separate current multiplier circuit corresponding to and electrically connected to each one of said plurality of second impedances, each of said current multiplier circuits being responsive to current flowing through the corresponding electrically connected second impedance and being responsive to said first and second output currents of said current divider circuit for producing a current multiplier output current proportional to the product of said current flowing through the corresponding electrically connected second impedance and the ratio between said first and second output currents of said current divider circuit,

whereby the values of said current multiplier output currents are accurately determined by said accurately predetermined impedance ratios and the impedance value of said precision impedance and are not substantially affected by the absolute impedance values of said first and plurality of second impedances.

4,017,751

ELASTIC VOLUME WAVE CONVOLUTION DEVICE

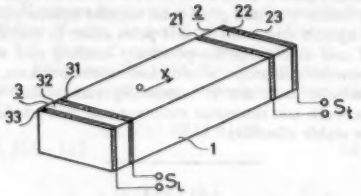
Bernard Desormiere, and Edouard Bridoux, both of Paris, France, assignors to Thomson-CSF, Paris, France

Filed Dec. 15, 1975, Ser. No. 640,563

Claims priority, application France, Dec. 17, 1974, 74.4141521

Int. Cl.² H01L *41/04*

U.S. Cl. 310—8.1 **4 Claims**

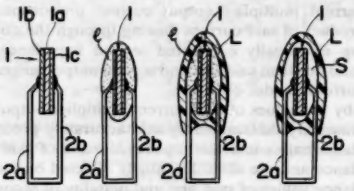


1. An elastic volume wave device for the convolution of a first and a second electric signal comprising a non piezoelectric substrate having two ends, first and second electromechanical transducer means located on said substrate adapted for respectively receiving a first carrier-wave modulated by said first electric signal and a second carrier wave modulated by said second electric signal and for producing in said substrate respectively transverse and longitudinal volume elastic waves propagating along a same axis for creating in said substrate a transverse resultant elastic wave travelling back to said first electromechanical transducer means adapted for transforming said resultant elastic-wave into a carrier wave modulated by an electric signal which represents, with time compression, the convolution product of said first and second electric signals.

4,017,752
PIEZOELECTRIC CERAMIC RESONATOR MOUNTING MEANS

Sasuga Kakehi, Kyoto; Jiro Miyazaki, Jyoyo, and Jiro Inoue, Nagaokakyo, all of Japan, assignors to Murata Manufacturing Co., Ltd., Japan

Filed Dec. 12, 1974, Ser. No. 532,180
Claims priority, application Japan, Dec. 14, 1973, 48-140935
Int. Cl.² H01L 41/04
U.S. Cl. 310—9.4 8 Claims



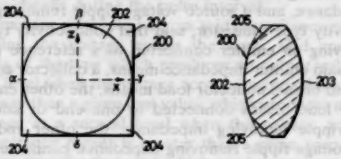
1. A piezoelectric ceramic resonator which comprises a piezoelectric ceramic wafer including a piezoelectric ceramic plate and electrodes formed thereon, at least two outer terminal plates each having at one end portion thereof an engaging portion, means for holding said engaging portion of each terminal plate to said electrodes at a position corresponding to a node or a point close to said node of each of said electrodes, such that said ceramic wafer is held between said engaging portions of said outer terminals to provide a resonator structure, and a porous outer layer of thermosetting resinous material surrounding said ceramic resonator with a space provided therebetween, said space completely surrounding said resonator structure, wherein a portion of each of said outer terminal plates is secured to said porous outer layer for effecting free vibration of said resonator structure in operation thereof, wherein said engaging portion of said outer terminal plate includes an approximately square portion having a larger dimension than that of said ceramic wafer, said square portion being formed with a notch in each side edge of said square portion, and a projection which extends toward said node or said point close to said node of each of said electrodes, said projection being formed in a central portion of said square portion, and wherein said side edge of said square portion of said terminal plate is secured in said porous outer layer except for said notch, and said projection on said square portion is pressed against said node or said point close to said node of each of said electrodes for positively holding said ceramic wafer between said projections on said square portions, so that said resonator structure is completely surrounded by said space between said resonator structure and said porous outer layer for stable vibration.

4,017,753
SHAPED QUARTZ CRYSTAL RESONATOR

Junichi Ishiwata; Hideo Suzuki, and Masakichi Sekiguchi, all of Tokyo, Japan, assignors to Kabushiki Kaisha Meidensha, Tokyo, Japan

Filed Jan. 29, 1976, Ser. No. 653,635
Claims priority, application Japan, Feb. 5, 1975, 50-16779[U]; Feb. 6, 1975, 50-17321[U]
Int. Cl.² H01L 41/04
U.S. Cl. 310—9.6 3 Claims

1. A quartz crystal resonator operating in the thickness-shear mode and having a rectangular quartz crystal with the ratio of the thickness to contour length exceeding 0.05, both opposite surfaces of said crystal having each only at the respective corner zones slant cut-away portions, each portion relatively steeply declining to terminate at the corner point of said crystal, of the thickness and contour length being uniform along the lines connecting the central points of respective opposite sides of said crystal, the cut-away portions each

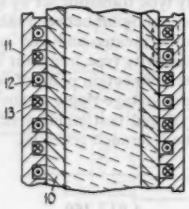


corresponding to the zone of minimum piezo-electrical activity.

4,017,754
ACTUATING DEVICES

Boaz Antony Jarrett, Sevenoaks, and Alec Harry Seilly, North Wembley, both of England, assignors to Simms Group Research & Development Limited, Birmingham, England

Filed Dec. 17, 1975, Ser. No. 641,369
Claims priority, application United Kingdom, Dec. 21, 1974, 55337/74
Int. Cl.² H01L 41/12
U.S. Cl. 310—26 13 Claims



1. An actuating device of the kind comprising an elongated member of annular form formed from a material having the property of magneto-striction, a winding which can be energised to cause a flow of magnetic flux in the member thereby to cause a change in a physical dimension of the member, said member being divided into a plurality of magnetic circuits disposed along the length of the member, portions of adjacent magnetic circuits being adjacent each other, the directions of flux flow in adjacent magnetic circuits being such that in said portions of two adjacent magnetic circuits, the flux flows are in the same direction, and a further member having a peripheral side surface in close proximity to a peripheral side surface of said first mentioned member, said further annular member having a two or a multiple of two, start helical thread like form in said peripheral side surface, said winding being accommodated in the grooves defined by the thread like form, said winding being arranged so that the direction of current flow in the two grooves or the adjacent grooves is in the opposite direction.

4,017,755
FLUID-COOLED ROTATING MEMBER WITH IMPROVED COOLANT EXHAUST STRUCTURE SUITABLE FOR SUPERCONDUCTING DYNAMOELECTRIC MACHINERY

Donald C. Litz, Monroeville, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Continuation of Ser. No. 263,039, June 15, 1972. This application Oct. 31, 1974, Ser. No. 519,725
Int. Cl.² H02K 9/00
U.S. Cl. 310—40 R 5 Claims

1. In apparatus in which a fluid is used as coolant for a member rotating about an axis of rotation:

means for exhausting coolant from the rotating member intended to be cooled, said means confining the coolant to a path along the axis of rotation for a distance in which radial coolant flow paths and radially displaced coolant flow paths are excluded to eliminate convection currents, said cooled member being supported within a substantially cylindrical supporting sleeve and said means for

exhausting coolant being axially adjacent said cooled member and within said sleeve, said means for exhausting coolant comprising a tube along the axis for carrying the coolant therein said tube being spaced from said supporting sleeve by an evacuated volume, and a plurality of thermally conductive members extending between said tube and said sleeve through said evacuated volume at axially spaced intervals.

4,017,756

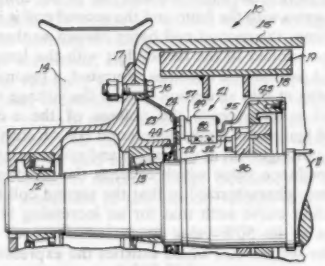
AUTOMATIC SENSOR POSITIONER

Hugh McDermand Davidson, Warren, Mich., assignor to Borg-Warner Corporation, Chicago, Ill.

Filed Aug. 18, 1975, Ser. No. 605,701

Int. Cl.² H02K *17/42*

U.S. Cl. 310—168 **11 Claims**



1. A wheel speed sensor assembly for utilization with a vehicle wheel rotatably mounted on an axle, comprising a rotor operatively connected to said wheel for rotation therewith, a magnetic sensing assembly including a housing, a sensor unit operatively positioned in said housing and having magnetic poles exposed at the forward end of the sensor unit facing the rotor, means on the sensor unit adapted to provide a predetermined spacing between the rotor and sensor unit, said housing and sensor unit having frictionally engageable surfaces, a generally U-shaped spring having one arm engaging the housing and the other arm engaging the sensor unit to bias the friction surfaces together, the top surface of the sensor unit is cut away to provide a shoulder adjacent the forward end of the sensor unit, said cutaway portion providing space for said spring, and mounting means operatively securing the magnetic sensing assembly on said axle.

4,017,757

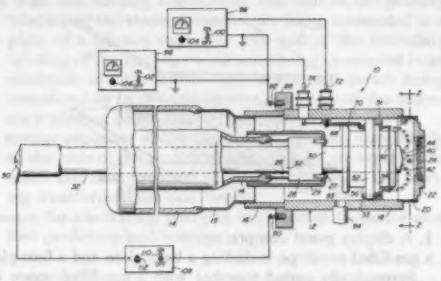
MULTI-TARGET X-RAY TUBE

Donald F. DeCou, Jr., West Redding, Conn., assignor to The Machlett Laboratories, Incorporated, Stamford, Conn.

Filed Jan. 2, 1976, Ser. No. 646,091

Int. Cl.² H01J *35/00*

U.S. Cl. 313—56 **7 Claims**



1. A stationary anode X-ray tube comprising:

a tubular envelope having an electrically conductive end portion, said end portion being closed by an X-ray transparent window made of electrically conductive material;

anode means supported within the envelope and including a plurality of stationary targets disposed in axial alignment with the window;

electron emitting means including a plurality of filaments supported within the envelope in radially spaced relationship with the anode means and electrically connected to the window for directing respective electron beams onto the targets, either simultaneously or alternatively; and

electrical means connected to the electron emitting means and to anode means for heating the filaments to electron emitting temperatures and for focusing the electron beams onto the respective targets.

4,017,758

INCANDESCENT LAMP WITH INFRARED FILTER

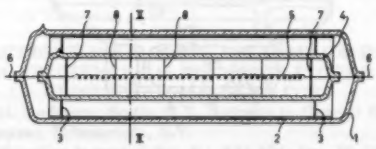
Friedrich Hermann Raymund Almer, Eindhoven, Netherlands, and Heiner Kostlin, Aachen-Schleckheim, Germany, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Mar. 28, 1975, Ser. No. 563,062

Claims priority, application Netherlands, Apr. 16, 1974, 7405071

Int. Cl.² H01J *61/40*

U.S. Cl. 313—112 **14 Claims**

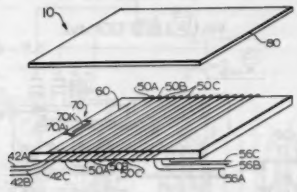


1. An electric incandescent lamp which comprises a filament body, a lamp envelope, a gas filling and a filter which is transparent to visible light and which reflects infrared radiation, said filter, being transparent to visible light and reflecting infrared radiation, comprise an interference filter and a heavily doped metal oxide filter with a plasma wavelength smaller than 1.4μum, which is disposed at the side of said interference filter which is remote from the filament body.

4,017,759
DISPLAY PANEL FOR DISPLAYING A BAR OF LIGHT

Donald E. Miller, Asbury, N.J., assignor to Burroughs Corporation, Detroit, Mich.

Filed July 31, 1975, Ser. No. 600,838
Int. Cl.² H01J 17/04; H05B 37/00
U.S. Cl. 313—217 2 Claims



1. A display panel comprising

a gas-filled envelope including a base plate and a face plate hermetically sealed together with a gas-filled space between them,

said base plate having a top surface inside said envelope an anode electrode,

a first continuous wire wound about said base plate with portions thereof positioned adjacent to the top surface of said base plate and comprising first cathode elements spaced apart from each other in a series,

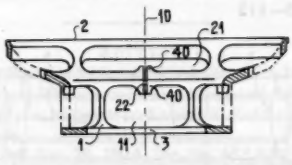
a second wire wound about said base plate, insulated from said first wire, with portions thereof positioned adjacent to the top surface of said base plate and comprising second cathode elements spaced apart from each other in a series, each second cathode element being positioned closely adjacent to a first cathode element, and

a third wire wound about said base plate, with portions thereof positioned adjacent to the top surface of said base plate and comprising third cathode elements spaced apart from each other in a series, each third cathode element being insulated from, and positioned closely adjacent to, a second cathode element.

4,017,760
PARASITIC OSCILLATION SUPPRESSOR FOR ELECTRONIC TUBES

Michel Benoit, and Pierre Gerlach, both of Paris, France, assignors to Thomson-CSF, Paris, France

Filed Jan. 9, 1976, Ser. No. 647,768
Claims priority, application France, Jan. 14, 1975, 75.00991
Int. Cl.² H01J 7/46, 19/80
U.S. Cl. 315—39 16 Claims

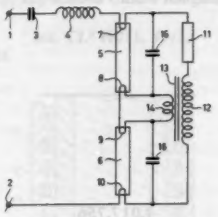


1. A device for suppressing parasitic oscillations in an electronic tube having a coaxial structure, comprising a component made of a material which is electrically conductive in the frequency range of said parasitic oscillations and substantially in the form of a cylinder with a flange, said component carrying a plurality of resonance circuits each of RLC type and incorporating at least one inductance constituted by an opening in said component coupled to at least one capacitor constituted by a slot in said component, said resonant circuits being tuned to the frequency range of said parasitic oscillations, the surface of said flange and the angle said flange makes with the surface of said cylinder being such that the impedance variation produced in the tube by said component is minimised.

4,017,761
ELECTRIC DEVICE FOR STARTING AND SUPPLYING A GAS-AND/OR VAPOR DISCHARGE LAMP

Leonard Woldring, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Nov. 25, 1975, Ser. No. 635,054
Claims priority, application Netherlands, Dec. 5, 1974, 7415839
Int. Cl.² H05B 41/23
U.S. Cl. 315—99 13 Claims



1. An electric device for starting and operating at least one electric discharge lamp comprising, two input terminals adapted for connection to an a.c voltage source, means connecting a series circuit incuding at least two coils and a capacitor across said input terminals so that in the operating condition of the device the capacitor and one of the coils are connected in series with the lamp and the second coil is in parallel with the lamp, the second coil being chosen so that with the AC voltage applied to the device but with the lamp not yet started said second coil becomes saturated, a resonant condition occuring at said saturation so that the voltage across the non-started lamp exceeds the voltage of the a.c. voltage source and ignites the lamp, the second coil on starting of the lamp being brought out of saturation and consequently assuming an impedance value which exceeds the resistance of the started lamp, characterized in that the second coil has a B-H magnetisation curve such that for an increasing H the ratio B/H drops to its 50% value at an instantaneous current i through the second coil which satisfies the expression:

$$0.5 \cdot \frac{Eb}{2fL} < i < \frac{Eb}{2fL}$$

where:

H is the magnetic field strength within the second coil;

B is the magnetic induction within the second coil;

i is the instantaneous electric current through the second coil (in Amperes);

Eb is the r.m.s. voltage across the started lamp (in Volts);

f is the frequency of the a.c. supply voltage (in Herz); and

L is the average self-induction of the second coil in its unsaturated condition.

4,017,762

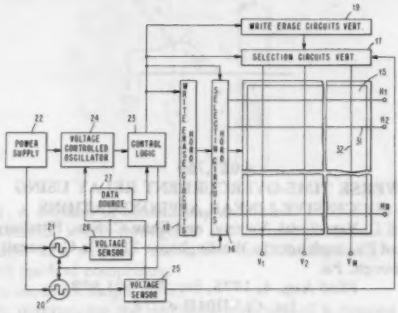
VOLTAGE CONTROLLED SUSTAIN FREQUENCY IN A GAS DISPLAY PANEL

Tony Nick Criscimagna, Woodstock, and Michael J. Steinmetz, Hurley, both of N.Y., assignors to IBM Corporation, Armonk, N.Y.

Continuation of Ser. No. 529,309, Dec. 4, 1974, abandoned. This application Mar. 30, 1976, Ser. No. 671,765

Int. Cl.² H05B *43/00, 41/00, 41/30*

U.S. Cl. 315—169 TV **3 Claims**



1. In a gas display panel comprising a plurality of light emitting cells formed at crossover points of two orthogonal sets of conductors and means comprising a sustain voltage generator for each of said two sets of conductors for applying an alternating polarity sustain voltage of predetermined amplitude and frequency between said two sets of conductors to sustain an ionized condition in said cells, said sustain voltage having operable values of amplitude between a minimum amplitude to sustain a previously ionized cell and a maximum amplitude to not ionize a previously erased cell, said minimum and maximum values having a predetermined approximately linear, positive, relationship to frequency of the sustain voltage, wherein the improvement comprises,

a voltage controlled oscillator and means connecting said oscillator to said means for applying said sustain voltage to establish the frequency of said sustain voltage,

means for deriving a voltage representative of said sustain voltage amplitude, and

means for changing the controlling voltage of said voltage controlled oscillator in response to said voltage that is representative of said sustain voltage amplitude to change the frequency of the sustain voltage according to said relationship of said minimum and maximum sustain amplitude values to sustain voltage frequency in the event that the amplitude of said sustain voltage drifts.

4,017,763

DEVICE FOR TRIGGERING THE DISCHARGE OF FLASH TUBES

Andre Schermesser, Kremlin Bicetre, France, assignor to Compagnie Generale d'Electricite, Paris Cedex, France

Filed Nov. 25, 1975, Ser. No. 635,014

Claims priority, application France, Nov. 29, 1974, 74.39197

Int. Cl.² H05B *41/32*

U.S. Cl. 315—240 **1 Claim**

1. Device for triggering the discharge of flash tubes and comprising:

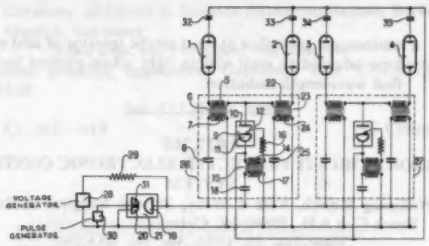
at least a switch comprising two main electrodes and an auxiliary electrode for controlling its electrical conduction;

a control transformer for controlling the switch, one end of the primary winding of the control transformer being connected to a plate of a control capacitor, the ends of the secondary winding of the control transformer being connected respectively to one main electrode and to said auxiliary electrode, means for charging said control capacitor and for discharging it in the primary winding of the control transformer so that the current induced in its secondary winding by the discharge is sufficient to make said switch conductive;

at least one starting transformer, one end of the primary winding of the starting transformer being connected to a plate of a starting capacitor, one end of the secondary winding of the starting transformer being connected to an electrode of one of said flash tubes, said switch being connected by its main electrodes in series with the secondary winding of the starting transformer;

a storage capacitor whose plates are connected respectively to the ends of the branch circuit in which are arranged in series said flash tube, the secondary winding of said starting transformer and said switch;

means for electrically charging said storage capacitor at a first predetermined voltage;



means for charging said starting capacitor and for discharging it into the primary winding of said starting transformer so that the voltage induced in its secondary winding by the discharge is sufficient for starting the discharge of said storage capacitor into said tube, said switch being conductive; and

wherein the means for electrically charging and discharging respectively said control and starting capacitors comprise:

a spark gap provided with two electrodes, means for setting up a second predetermined voltage between the two electrodes, the other end of the primary winding of said starting transformer and the other plate of said starting capacitor being connected respectively to the two electrodes of the spark-gap, the other end of the primary winding of said control transformer and the other plate of said control capacitor being connected respectively to the two electrodes of the spark-gap; and

means for causing an electric discharge between the two electrodes of said spark-gap, the electrodes being charged to said second predetermined voltage.

4,017,764

ELECTRODELESS FLUORESCENT LAMP HAVING A RADIO FREQUENCY GAS DISCHARGE EXCITED BY A CLOSED LOOP MAGNETIC CORE

John M. Anderson, Scotia, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Continuation-in-part of Ser. No. 542,374, Jan. 20, 1975, abandoned. This application Dec. 18, 1975, Ser. No. 642,142

Int. Cl.² H05B *41/24*

U.S. Cl. 315—248 **51 Claims**

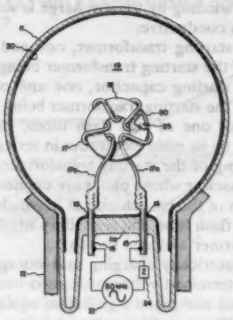
1. An improved fluorescent lamp comprising:

an evacuable, light-transmissive envelope having a substantially globular upper shell;

a closed loop magnetic core contained within said envelope;

means for energizing said core with a radio frequency magnetic field;

a gaseous medium within said envelope adapted to sustain an electric discharge due to an electric field induced therein by said magnetic core and to emit radiation at a first wavelength when sustaining said discharge; and



a luminescent phosphor at least on the interior of said envelope adapted to emit visible light when excited by said first wavelength radiation.

4,017,765

SHORT CIRCUIT PROTECTED ELECTRONIC CONTROL SYSTEM

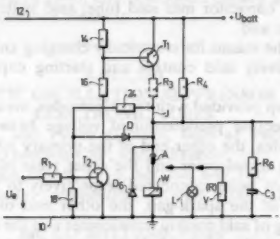
Wolfgang Maisch, Ville d'Avray, France, assignor to Robert Bosch G.m.b.H., Stuttgart, Germany

Filed Jan. 28, 1976, Ser. No. 653,280

Claims priority, application Germany, Apr. 15, 1975, 2516347

Int. Cl.² H02H *3/24*

U.S. Cl. 361—88 **16 Claims**



1. Short circuit protected electronic control system to protect a power transistor (T_1) against short circuit in a load (W, L, V) connected in series with the emitter-collector path of the power transistor, in which the series circuit formed by the emitter-collector path of the power transistor (T_1) and the load (W, L, V) is essentially directly connected across a power source (**10, 12; P,** U_{batt}) to permit application of essentially full source voltage to the load upon conduction of the transistor,

said system having a driver transistor (T_2), the emitter-collector path of which is connected to the base of the power transistor (T_1) to control conduction thereof, said system further comprising

a resistor (R_4) connected in shunt with the emitter-collector path of the power transistor (T_1) and having one terminal thereof connected to the junction (J) of the emitter-collector path of the power transistor (T_1) and the load (W, L, V);

and a diode (D) connected between said junction (J) and the base of the driver transistor and poled to block the voltage of the junction (J) from the base of the driver transistor (T_2), the voltage at said junction, under normal operating conditions, being determined by the relative internal resistance of the power transistor (T_1) and the resistance of the load and being blocked by said diode so that, under normal conditions, the operation of the circuit is unaffected by the presence of the diode (D) while, under short circuit conditions of the load (W, L, V), the diode becomes conductive and effectively short-circuits the base of the driver transistor (T_2) to cause the driver transistor to block and control the power transistor, likewise, to block and thus prevent damage to the power transistor (T_1) upon short circuit arising in the load.

4,017,766

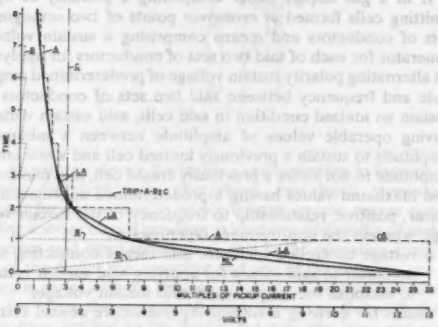
INVERSE TIME-OVERCURRENT RELAY USING SUCCESSIVE LINEAR APPROXIMATIONS

Leonard C. Vercellotti, Verona, and Shan C. Sun, Pittsburgh, both of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Aug. 4, 1975, Ser. No. 601,898

Int. Cl.² H01H *47/18*

U.S. Cl. 361—83 **15 Claims**

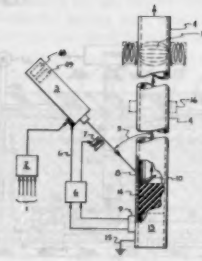


1. An inverse time-overcurrent relay for controlling an electric circuit, said relay comprising: input means adapted to be energized from said circuit for providing a first output quantity having a magnitude which is a function of the magnitude of the current in the electric circuit, a quantity magnitude comparing network having first and second inputs and an output, first circuit means operatively connecting said first input to said input means whereby said first input of said comparing network is energized by said first output quantity, a quantity magnitude generating means effective to alter the magnitude of a second output quantity in accordance with a predetermined pattern, said pattern comprising slope controlling means effective to change the magnitude of said second quantity at a different time rate, sequencing means connected to said generating means and effective to cause said generating means to progressively generate said rates in a sequence in which the magnitude of said second quantity progresses from a first to a second magnitude, second circuit means connecting said second input of said comparing network to said generating means for energizations by said second output quantity, said comparing network being effected to alter the conditions of its said output when the relative magnitudes of said quantities supplied to its said inputs reaches a desired relationship, and control means energized from said input means and effective when the magnitude of the current in said electric circuit reaches a predetermined minimum magnitude to render said generating means effective.

4,017,767
LASER LIGHTNING ROD SYSTEM

Leonard M. Ball, Rte. 4, Box 319-U, Eugene, Oreg. 97405

Filed Dec. 10, 1973, Ser. No. 423,239
Int. Cl.² H02H *3/22*
U.S. Cl. 361—117 9 Claims

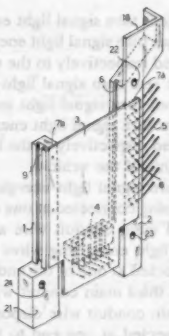


1. A method of establishing an ionized conductive path of substantial length through air and thereby predetermining the course of a stepped leader and resultant lightning channel, such method comprising:
   a. mode locking a laser;
   b. determining the probable presence of a stepped leader and activating said mode-locked laser to produce a laser beam composed of clusters of photons before said lightning channel is established;
   c. passing the beam produced from said mode-locked laser through said air and establishing by multi-photon ionization an ionization path of sufficient concentration and length to guide said stepped leader toward a predetermined location; and
   d. electrically coupling said ionization path to ground.

4,017,768
CONNECTING DEVICE FOR TELECOMMUNICATION CIRCUITS, PARTICULARLY FOR THE SECTIONING THEREOF

Cesare Valfre, Via Borgosesia 46 bis, Turin, Italy

Filed Nov. 7, 1975, Ser. No. 627,031
Claims priority, application Italy, Dec. 23, 1974, 70731/74
Int. Cl.² H05K *7/14*
U.S. Cl. 361—399 4 Claims

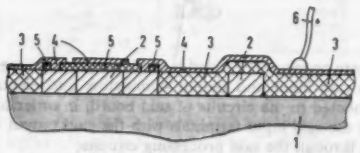


1. A connecting device for telecommunication circuits, more particularly for the sectioning thereof, characterized in that it comprises two parts which may be coupled with each other, of which the first consists of two parallel rods, of different lengths, connected by a substantially rectangular printed circuit provided with a connector, the longer rod having on its outer face input terminals and on the opposed face a groove extending over the greatest part of its length; a face of said rods, parallel with the printed circuit, having a hollow able to house one of two opposed edges of the printed circuit and, on the longer rod, the inner ends of the input terminals; the outer face of the shorter rod having a longitudinal groove with double edge; the second part of the device being formed by a single side rod, externally provided with output terminals and having a hollow able to house an edge of a second, cantilevered printed circuit and the inner ends of the output terminals, one end of the second printed circuit being connected to a connector to which a third printed circuit is joined, said third circuit being kept parallel with the second one and being provided at the opposed end with the contacts able to engage the connector of the said first part, whereas the second and third printed circuits bear the components apt to carry out on the incoming signals the desired processings and treatments.

4,017,769
INTEGRATED CIRCUITS AND METHOD OF PRODUCING THE SAME

Charlotte Raetzel, Munich, and Jenoë Tihanyi, Neuried, both of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Feb. 16, 1973, Ser. No. 333,334
Claims priority, application Germany, Feb. 17, 1972, 2207510
Int. Cl.² H05K *5/00*
U.S. Cl. 361—419 15 Claims



1. An integrated circuit comprising an electrically insulating substrate formed of sapphire or spinel, a plurality of individual areas of a semiconductor layer supported on said substrate, a metallic conductor path supported on said substrate for connecting an external electrode with at least a portion of said semiconductor layer, and an electrically insulating intermediate layer interposed between said substrate and said conductive path and underlying all of the junction between said external electrode and said conductive path, said intermediate layer being disposed immediately on said substrate under said junction and immediately under said conductive path, and formed of SiO_2 or Si_3N_4.

4,017,770
CONNECTING DEVICE FOR TELECOMMUNICATION CIRCUITS

Cesare Valfre, Turin, Italy, assignor to Applicazione Elettrotelefoniche SpA, Turin, Italy

Filed Nov. 22, 1974, Ser. No. 526,317
Int. Cl.² H02B *1/02*
U.S. Cl. 361—399 6 Claims

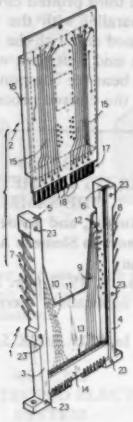
1. A connecting device for telecommunication circuits, to allow the transfer of signals from input terminals receiving the signals to be processed to output terminals carrying the processed signals, the said transfer being through circuits suitable to carry out said processing, said connecting device comprising:
   a three-sided frame made of insulating material and shaped as a rectangle open in correspondence of one of the minor sides thereof;
   input and respectively output terminals on one outwardly directed face of two opposite sides of said three-sided frame, said terminals having an end portion thereof embedded in the material of said sides and ending on the inner face thereof;

guiding grooves on the said inner face of the opposite sides of said three-sided frame;

a movable board, having edges engaging said grooves and having shape and size such as to be coincident with the shape and size of the frame concavity;

printed circuits on the faces of said board, for connecting electrical components for processing said input signals;

input and output connectors connected to said input and output terminals respectively;



conjugate connectors carried by said board and cooperating with said input and output connectors and electrically connected to the circuits of said board, in order to connect the said input terminals with the said output terminals through the said processing circuits;

said two opposite sides of said frame are connected by a fixed board provided with a connector and with printed leads which have one end connected to contacts in the connector and the other end connected to the input or respectively output terminals, the said fixed board being parallel to the said movable board.

4,017,771

SAFEGUARDED SWITCHING DEVICE

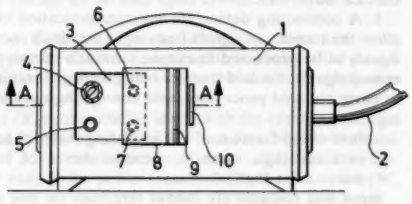
Ludwig G. Baumann, Im Reckholder, 9527 Niederhelfensch wil, Switzerland

Filed July 21, 1975, Ser. No. 597,351

Claims priority, application Germany, Oct. 19, 1974, 2449745

Int. Cl.² H01H *3/20*

U.S. Cl. 361—357 **5 Claims**



2. A safeguarded switching device, as claimed in claim 1, in which said motor master switch is a normally open switch.

4,017,772

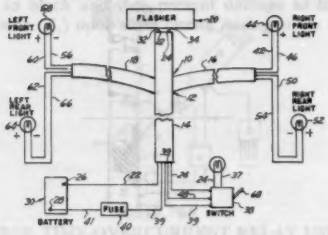
TURN SIGNAL WIRING REPLACEMENT HARNESS

Ernest Burnside, 3843 Rohns, Detroit, Mich. 48214

Filed May 22, 1975, Ser. No. 580,012

Int. Cl.² H02B *1/20;* **B60Q** *1/46*

U.S. Cl. 361—428 **1 Claim**



1. A motor vehicle turn signal wiring replacement harness adapted to be owner-installed between the right and left front and rear turn signal lights and the two terminals of the vehicle storage battery and the conventional turn signal operating switch already present in the vehicle, said harness comprising

an approximately cruciform electrical wiring conduit of flexible material having a main conduit portion and right and left branch conduit portions stemming from said main conduit portion near one end thereof.

a flasher disposed at one end of said main conduit portion and having terminals,

a first main conduit wire disposed in said main conduit portion and connected at one end to one terminal of said flasher and adapted to be connected at its other end to one terminal of the vehicle storage battery,

a second main conduit wire disposed in said main conduit portion and connected at one end to the other terminal of said flasher and at its other end to one side of said signal operating switch,

a third main conduit wire disposed in said main conduit and connected at one end to said one side of said operating switch,

a pair of right front turn signal light energizing wires and a pair of right rear turn signal light energizing wires adapted to be connected respectively to the right front turn signal light and right rear turn signal light of the vehicle,

a pair of left front turn signal light energizing wires and a pair of left rear turn signal light energizing wires adapted to be connected respectively to the left front and left rear turn signal lights of the vehicle,

one of said turn signal light energizing wires of each of said pairs being connected at one of the ends thereof to said second main conduit wire and the other of said turn signal light energizing wires of each of said pairs being connected at one of the ends thereof to the other end of said third main conduit wire,

and a fourth main conduit wire disposed in said main conduit and connected at one end to the other side of said operating switch and adapted to be connected at its other end to the other terminal of the vehicle storage battery,

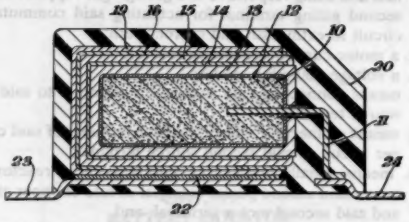
said pairs of said energization wires for said right front and rear turn signal lights being disposed within said right branch conduit portion, and said pairs of said energization wires for said left front and rear turn signal lights being disposed within said left branch conduit portion.

4,017,773

SOLID VALVE-METAL CAPACITOR WITH BURIED GRAPHITE IN THE PARTICLES IN THE ELECTROLYTE

David M. Cheseldine, Bennington, Vt., assignor to Sprague Electric Company, North Adams, Mass.

Filed May 27, 1975, Ser. No. 581,192
Int. Cl.² H01G 9/00, 9/16; B01J 17/00
U.S. Cl. 361—433 8 Claims



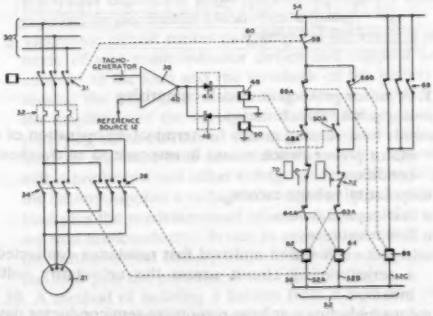
1. In a solid electrolytic capacitor including a porous valve-metal body, an oxide film of said valve-metal covering the surfaces of said body, a solid electrolyte coating of manganese dioxide overlying said oxide film, an outer layer of graphite lying over the outer surface of said manganese dioxide coating, and a conductive counterelectrode overlying said outer layer of graphite, the improvement comprising at least one buried layer of graphite that is buried within said manganese dioxide coating, defined at least one sandwiched layer portion of said manganese dioxide coating between adjacent of said graphite layers, said sandwiched portion containing particles of graphite that provide a low electrical impedance between said adjacent graphite layers.

4,017,774

BOTTLE LABELING SYSTEM

Rainer Buchholz, Dusseldorf-Gerresheim, Germany, assignor to Jagenberg Werke AG, Dusseldorf, Germany

Continuation-in-part of Ser. No. 347,955, April 1, 1973, abandoned. This application May 30, 1975, Ser. No. 582,535
Claims priority, application Germany, Apr. 29, 1972, 2221199
Int. Cl.² H02P 5/46
U.S. Cl. 318—39 3 Claims



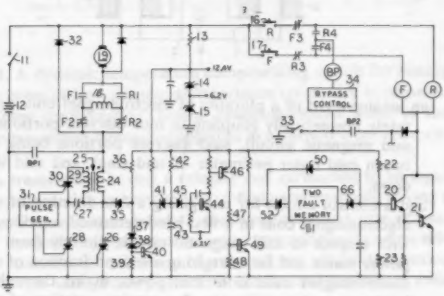
1. An apparatus for labelling containers comprising a first transport for driving said containers to and from a labelling station, and a second transport placing labels on said containers, each of said first and second transports independently motor controlled, a first motor for controlling said first transport and a second motor for controlling said second transport, a third motor for adjusting the speed of said first motor and a fourth motor for adjusting the speed of said second motor, means for deriving a signal having a magnitude representing the speed of said first transport, means for deriving a signal having a magnitude representing the speed of said second transport, a reference source, means for comparing said reference source against each of said signal levels to determine deviation of each said transport speed from said reference source, a line for controlling the speed of said third motor in response to a deviation between the magnitude of the signal representative of the speed of said first transport and said reference signal, and a line for controlling the speed of said fourth motor in response to a deviation between the magnitude of the signal representative of the speed of said second transport and said reference signal, each of said control lines for the third and fourth motor speeds including switching means responsive to said deviation for energizing a contact for applying power to said third and fourth motors in respectively opposite directions.

4,017,775

FAULT DETECTOR CIRCUIT WITH TWO-FAULT MEMORY

Robert W. Artrip, Northfield, Ohio, assignor to Cleveland Machine Controls, Inc., Cleveland, Ohio

Filed Oct. 28, 1975, Ser. No. 626,502
Int. Cl.² H02P 3/08
U.S. Cl. 318—139 4 Claims



1. Means for disabling an electrical drive system including an electric motor and power switching means for coupling said motor across a source of electrical energy, comprising:

a. sensing means coupled to the power switching means for producing a fault signal in response to each persistence of conductivity of said power switching means beyond a predetermined period of time;

b. first disable means for producing a disable signal in response to and only during the presence of each fault signal;

c. second disable means independent of said first disable means and including a counter operable by said fault signals for producing a continuous disable signal in response to and after the presence of a predetermined number of fault signals greater than one;

d. means independently responsive to said first and second disable means and for interrupting the flow of power to said motor from said source in response to and during the presence of either of said disable signals from said first and second disable means.

4,017,776

REVERSIBLE SHADED POLE MOTOR AND CONTROL ARRANGEMENT THEREFOR

Josef Fiegel, Landshut, Germany, assignor to International Standard Electric Corporation, New York, N.Y.

Filed Dec. 11, 1975, Ser. No. 639,914
Int. Cl.² H02P 1/40
U.S. Cl. 318—208 7 Claims

1. A reversible, salient-pole, AC motor of the shaded-pole type, having a squirrel-cage rotor and comprising:

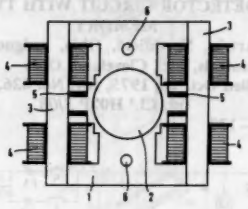
a magnetic circuit symmetrical about two mutually orthogo-

nal axes in a plane normal to the shaft of said rotor, said magnetic circuit including a lamination stack of geometrically regular outer perimeter with four equal and like-shaped windows, one of said windows being in each quadrant of said plane, said lamination stack having a centrally located opening through which said rotor is rotationally installed;

a pair of salient main magnetic poles formed by said lamination stack, said main poles of said main pair being diametrically opposite abutting said central opening;

a pair of salient auxiliary magnetic poles formed by said lamination stack, said auxiliary poles of said auxiliary pair being diametrically opposed abutting said central opening, said auxiliary poles being orthogonally oriented in said plane with respect to said main poles;

shading rings placed about at least one of said salient auxiliary poles adjacent said central opening;



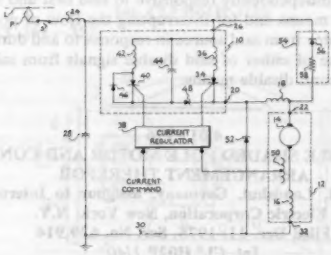
an arrangement of a plurality of electromagnet coils separately magnetically coupling to four discrete portions of said magnetic circuit, said discrete portions being between said outer perimeter of said stack and said windows;

and a control circuit for energizing a first fraction of said electromagnet coils in a first predetermined relationship with respect to said magnetic circuit directly from the power mains and for energizing a second fraction of said electromagnet coils from said power mains through at least one series resistance, for causing rotation of said rotor in a first direction, said control circuit being controllable to alternatively energize said second fraction of said electromagnet coils directly from said power mains and said first fraction of said electromagnet coils from said mains through said series resistance to produce rotation of said rotor in the reverse direction.

4,017,777
LOAD VOLTAGE CLAMPING CIRCUIT FOR VOLTAGE TURN-OFF CHOPPER

Ronald Barry Bailey, Erie, Pa., assignor to General Electric Company, Erie, Pa.

Filed Dec. 22, 1975, Ser. No. 643,268
Int. Cl.² H02P 9/10
U.S. Cl. 318—342 **4 Claims**



1. An electric motor power control system comprising:

a. first and second source terminals adapted for connection to a source of direct current power;

b. a direct current electric traction motor having first and second motor terminals and including an armature winding and a field winding serially connected between said motor terminals;

c. a voltage turn-off chopper circuit including a main thyristor and a commutation circuit and having first and second power terminals and first and second gating terminals, said chopper circuit being responsive to a gating signal applied to said first gating terminal to provide a current path between said first and second power terminals and being responsive to a gating signal applied to said second gating terminal for actuating said commutation circuit to extinguish said current path;

d. a motor current smoothing reactor;

e. a voltage clamping circuit;

f. means connecting said first motor terminal to said first source terminal;

g. means connecting said first power terminal of said chopper circuit to said second source terminal;

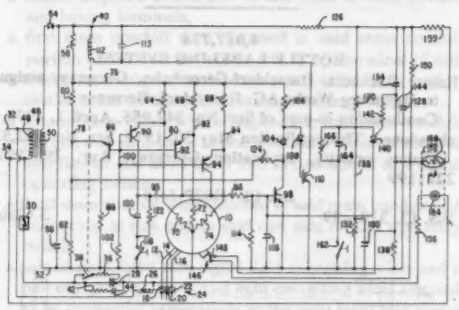
h. means serially connecting said smoothing reactor between said second power terminal of said chopper circuit and said second motor terminal; and

i. means serially connecting said clamping circuit between said second motor terminal and said second source terminal whereby commutation voltages produced by said chopper circuit and exceeding the magnitude of voltage at said second source terminal are dropped across said smoothing reactor.

4,017,778
MOTOR PROTECTION CIRCUIT

Erich O. Koch, King of Prussia, Pa., assignor to Robertshaw Controls Company, Richmond, Va.

Filed Sept. 6, 1974, Ser. No. 503,813
Int. Cl.² H02H 5/04
U.S. Cl. 318—473 **15 Claims**



1. A motor protection circuit comprising

motor power switch means,

motor heat sensing means for terminating operation of the motor power switch means in response to an overheated condition,

unipolarity voltage means,

a first capacitance,

a first resistance,

said first capacitance and said first resistance connected in a series timing circuit across the unipolarity voltage means,

means including a voltage responsive semiconductor device responsive to a predetermined charge on the first capacitance for terminating operation of the motor power switch means,

lubricating fluid pressure responsive switch means connected to the timing circuit for preventing the charging of the first capacitance,

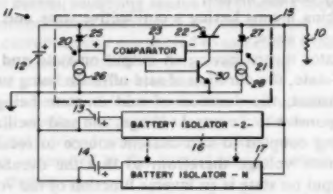
a series reset circuit including a second capacitance and a normally open reset switch means connected to the voltage responsive semiconductor device, and

means including a second resistance connected across the second capacitance to bias the second capacitance to a predetermined condition sufficient to temporarily disable the means for terminating the operation of the motor power switch means when the reset switch means is closed but insufficient to maintain the disablement of the means for terminating operation of the motor power switch means when the reset switch means is held closed.

4,017,779
BATTERY ISOLATOR

James Anthony McDonald, Buffalo Grove, and Ralph Arthur Schatz, Chicago, both of Ill., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Mar. 22, 1976, Ser. No. 668,756
Int. Cl.² H02J *7/00, 3/32*
U.S. Cl. 320—15 **10 Claims**



1. A battery isolator adapted to connect the terminals of a battery to a load and isolate the battery from other power sources connected to the load in parallel with the battery and providing a voltage across the load, said isolator comprising:

a. a semiconductor device having first, second and control electrodes with the first and second electrodes adapted to be connected in series with the battery and the load, and providing an offset voltage between the first and second electrodes dependent upon the amount of drive current supplied to the control electrode;

b. electronic circuit means connected to the control electrode of said semiconductor device and adapted to be coupled to the load and the terminals of the battery for sensing the amplitude of the voltage across the load and the amplitude of the voltage across the battery and for supplying drive current to said semiconductor device to tend to maintain said semiconductor device operating with a predetermined offset voltage thereacross as long as the battery supplies a voltage above the voltage across the load plus the predetermined offset voltage and for causing said semiconductor device to cease conducting when the voltage of the battery drops below the voltage across the load plus the predetermined offset voltage.

10. A method of isolating a battery from a load and other batteries each connected in parallel therein and supplying a voltage to the load, comprising the steps of:

a. connecting a series pass transistor in series with the battery to be isolated and the load;

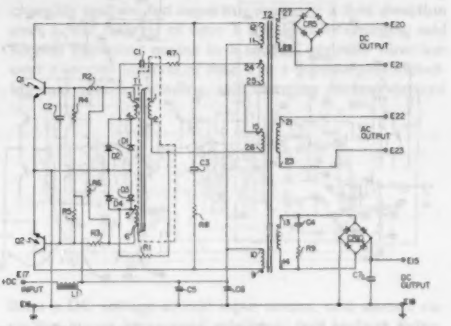
b. comprising the voltage of the battery to be isolated with the voltage across the load plus a predetermined offset voltage across the series pass transistor; and

c. stopping conduction of the series pass transistor when the voltage of the battery is less than the voltage across the load plus the predetermined offset voltage.

4,017,780
DYNAMIC TEMPERATURE COMPENSATING CIRCUIT FOR POWER TRANSISTOR CONVERTERS

Philip M. Cowett, Jr., Olney, Md., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Dec. 16, 1975, Ser. No. 641,312
Int. Cl.² H02M *3/335*
U.S. Cl. 321—2 **13 Claims**



1. A dynamic temperature compensating circuit for biasing the bases of first and second transistors connected in common emitter configuration, having collector-emitter paths of the two transistors connected together in a current loop, comprising:

a transformer having a primary coil connected to an input alternating current source, a first secondary coil having a first side connected to the base of a first one of said transistors, and a second secondary coil having a first side connected to the base of a second one of said transistors, with said primary and first and second secondary coils being poled in the same direction;

a first and a second resistor having a common first node connected to a first D.C. potential, said first resistor being connected between said first node and either side of said first secondary coil and said second resistor being connected between said first node and either side of said second secondary coil;

a first and second diodes connected in parallel and oppositely poled between the second side of said first secondary coil and a second node connected to the common emitters of said transistors;

a third and fourth diodes connected in parallel and oppositely poled between the second side of said second secondary coil and said second node;

a capacitor connected between said second side of said first secondary coil and a first side of said primary coil;

a resistance connected between said second side of said second secondary coil and the second side of said primary coil;

said second diode poled in the same direction as the base-to-emitter junction of said first transistor, forward biasing said first transistor by the diode forward bias potential, when said transformer saturates and said first transistor has been in its off-state, so as to promote instantaneous conduction by said first transistor thereby avoiding cross-over distortion;

said diode forward bias potential of said second diode maintaining equality with the base-to-emitter forward bias potential of said first transistor over a range of temperatures;

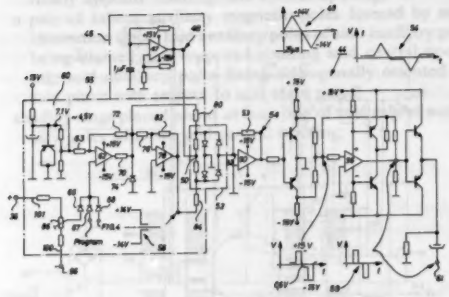
whereby the output characteristics of said current loop are compensated for temperature fluctuations.

4,017,781

D.C. VOLTAGE CONVERTER

Peter Müller, Moosinning, Germany, assignor to Garching Instrumente Gesellschaft zur industriellen Nutzung von Forschungsergebnissen m.b.H., Garching, Germany

Filed July 30, 1975, Ser. No. 600,520
Int. Cl.² H02P 13/22
U.S. Cl. 321—2 7 Claims



1. A D.C. to D.C. voltage converter for producing a regulated, adjustable D.C. output voltage from an unregulated D.C. input voltage, which comprises:

an inverter means for producing alternating rectangular output pulses from the unregulated D.C. input voltage wherein the timing and duration of said inverter output pulses are determined by alternating rectangular control pulses;

rectifier means for producing said regulated D.C. output voltage from said inverter output pulses; and

control pulse generating means for producing said control pulses wherein the duration of said control pulses is determined by said regulated D.C. output voltage to stabilize same,

characterized in that said control pulse generating means includes:

means for generating a D.C. reference voltage;

first operational amplifier means, having an inverting input, a non-inverting input, and an output, for comparing at least a portion of said regulated D.C. output voltage with said reference voltage to produce an error voltage.

means for producing a positive and a negative threshold voltage, each proportional to said error voltage;

oscillator means for generating an alternating, triangular wave voltage;

a first threshold circuit means for combining said triangular wave voltage with said positive threshold voltage to produce positive signal pulses corresponding to positive portions of said triangular wave exceeding said positive threshold voltage;

a second threshold circuit means for combining said triangular wave voltage with said negative threshold voltage to produce negative signal pulses corresponding to negative portions of said triangular wave exceeding said negative threshold voltage;

means for combining said positive and negative signal pulses to produce alternating triangular signal pulses; and

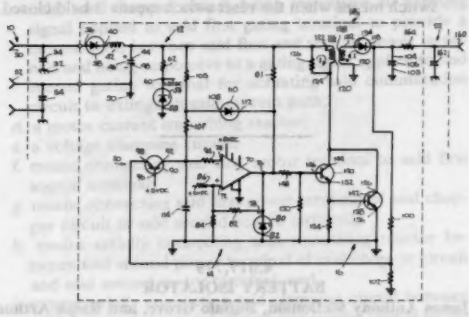
pulse forming means for converting said alternating triangular signal pulses into said alternating rectangular control pulses.

4,017,782

DC-DC CONVERTER

Bruce C. Wheeler, Colchester, Vt., assignor to General Electric Company, Burlington, Vt.

Filed Nov. 7, 1975, Ser. No. 630,551
Int. Cl.² H02M 3/335
U.S. Cl. 321—2 6 Claims



1. A DC to DC converter comprising:

a relatively low voltage, direct current source;

first inductor means and second inductor means, mutually magnetically coupled;

rectifier means;

energy storage means;

switching means having a conductive state and a nonconductive state;

oscillator means having an output on-state and an output off-state, the duration of said off-state being substantially constant, the duration of said on-state being inversely responsive to a control voltage, and said oscillator means being coupled to said current source to receive such a control voltage therefrom so that the duration of said output on state is an inverse function of the voltage level of said current source;

oscillator control means;

said current source, said first inductor means and said switching means being coupled in an input current series loop;

said second inductor means, said rectifier means and said energy storage means being coupled in an output current series loop;

said oscillator means being coupled to said switching means, and when in said output on-state causing said switching means to be in its conductive state, and when in its output off-state causing said switching means to be in its nonconductive state.

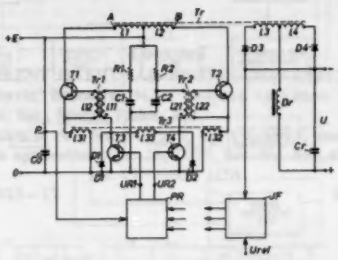
said oscillator control means being coupled to and between said energy storage means and said oscillator means to provide a signal to said oscillator means to progressively reduce said duration of said output on-state to substantially zero in response to the voltage level of said storage means progressively reaching a preset value;

said rectifier means and said second inductor means being of such polarity and winding orientation respectively with respect to the winding orientation of said first inductor means, that when said switching means is in its on-state, said rectifier means is not conducting and said second inductor means is open circuited and, therefore, said first inductor means stores energy in its magnetic field, and when said switching means is in its off-state, said first inductor means is open circuited, said rectifier means is conducting and said second inductor means extracts energy from said magnetic field,

4,017,783
POWER TRANSISTOR DRIVE APPARATUS IN A DC-CONVERTER

Bengt Holger Assow, and Kjell Ove Rolleberg, both of Norsborg, Sweden, assignors to Telefonaktiebolaget L M Ericsson, Stockholm, Sweden

Filed May 5, 1976, Ser. No. 683,681
Claims priority, application Sweden, May 22, 1975, 7505828
Int. Cl.² H02M 3/335
U.S. Cl. 321—2 **4 Claims**



1. Power transistor drive apparatus in a DC-converter, said converter having first and second terminals for respective connection to the terminals of a DC supply voltage, a main transformer means, rectifying means and filtering means, said power transistors being alternately conducting and each having a main current circuit connected to said main transformer means and a control current circuit, comprising

a first and a second drive transistor,

a first and a second drive transformer each consisting of a primary winding connected to one of said terminals via one of said drive transistors and at least one secondary winding connected to the control current circuit of said power transistors,

a further transformer consisting of a first and a second winding connected to said main current circuit of each of the power transistors, an a third winding connected to one of the primary windings of said first and second drive transformers for transferring, via said first winding and one of said drive transformers, a current proportional to the current through the main current circuit of one of said power transistors to the control circuit of the same transistor and, at the same time, for creating a voltage drop across

said secondary winding which counteracts conducting of the non-conducting power transistor, and

a first and a second capacitor connected to the primary winding of said first and second drive transformer and to one of said terminals, said capacitors each being charged via the third winding of said further transformer when the associated power transistor is conducting and being discharged when the same transistor is non-conducting, whereby the capacitor voltage provides further blocking of the transistor.

4,017,784
DC TO DC CONVERTER

David Harry Simmons, Palo Alto, and Paul Calvin Launderville, Redwood City, both of Calif., assignors to Litton Systems, Inc., San Carlos, Calif.

Filed May 17, 1976, Ser. No. 686,797
Int. Cl.² H02M 3/335
U.S. Cl. 321—2 **5 Claims**

1. In a DC to DC converter the combination including:

a transformer means, said transformer means including: a primary winding, and a secondary winding, said secondary winding being loosely coupled to said primary to provide a predetermined effective leakage inductance with respect to said primary winding;

rectifier means connected to said secondary winding for supplying a rectified output;

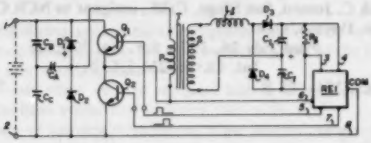
filter capacitor means coupled to the output of said rectifier means for smoothing said rectified voltage;

means for connecting an electrical load across said filter capacitor means;

second capacitor means, said second capacitor means connected in series circuit with said primary winding;

input means for receiving a DC voltage for conversion to a different DC voltage;

electronic switching means for periodically and alternately charging said second capacitor means in a first direction over a first interval of time T followed by charging said second capacitor means in a second opposite direction over a second interval of time T in a current path including said primary winding, said charging current derived



from a DC voltage at said input means, said second capacitor means being sized relative to said leakage inductance of said transformer and to the impedance characteristics of said electrical load and said filter capacitor means for causing said current in said current path to have the waveform essentially of half sinusoids over a portion of each time interval;

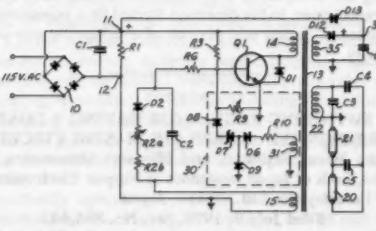
clamping diode means coupled to said second capacitor means for limiting the level of voltage across said second capacitor means to below the level applied across said input means;

and regulating means coupled to said switching means for regulating said interval of time, T, or said periodicity as a function of voltage level monitored across said filter capacitor means for maintaining said voltage across said filter capacitor means at a constant level irrespective of the voltage variation at said input means.

4,017,785
POWER SOURCE FOR FLUORESCENT LAMPS AND THE LIKE

Lloyd J. Perper, Tucson, Ariz., assignor to Iota Engineering Inc., Tucson, Ariz.

Filed Sept. 10, 1975, Ser. No. 611,897
Int. Cl.³ H02M 5/458
U.S. Cl. 321—4 **6 Claims**



1. In a high frequency power source for a load such as gas discharge lamps, and having an inverter with power supply, oscillator circuit and transformer, said power supply having a first rectifier and filter circuit with ac input terminals and dc output terminals and providing a first dc voltage at said dc terminals, said transformer having primary, secondary and feedback windings, said oscillator circuit including a transistor

having emitter and collector electrodes connected in series with said primary winding across said dc terminals and having the base and one of said electrodes connected across said feedback winding, the improvement comprising:

an output winding on said transformer;

a second rectifier and filter circuit connected across said output winding for developing a second dc voltage from the oscillator output; and

first means for connecting said second dc voltage in circuit with said first dc voltage in aiding relation to supplement the fluctuating first dc voltage thereby reducing the ac line current peaks and the power factor at the ac input terminals.

4,017,786

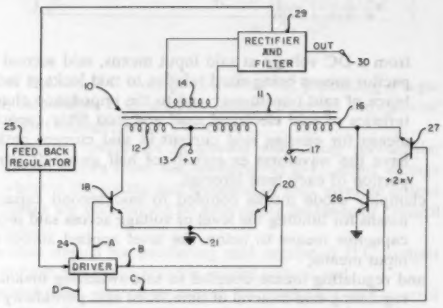
TRANSFORMER SATURATION CONTROL CIRCUIT FOR A HIGH FREQUENCY SWITCHING POWER SUPPLY

Joseph C. Jensen, San Diego, Calif., assignor to NCR Corporation, Dayton, Ohio

Filed July 26, 1976, Ser. No. 708,525

Int. Cl.² H02M 7/537

U.S. Cl. 321—45 R **7 Claims**



1. A power supply circuit comprising:

a saturable core transformer, said transformer including a primary winding, a secondary winding for feeding a load and a tertiary winding;

first and second power switching elements for operatively connecting a power source in circuit with the primary winding of said transformer;

drive means for alternately rendering said power switching elements conductive with periods of overlapping non-conductivity therebetween, wherein each of said power switching elements tends to cause saturation in said saturable core transformer in opposite directions;

biasing means operatively connected to said tertiary winding for completing the saturation of said saturable core transformer, in the direction started by a power switching element, during said periods of overlapping non-conductivity.

4,017,787

SWITCHING REGULATOR HAVING A LOAD RESPONSIVE ALTERNATE BIASING CIRCUIT

Hirohito Hara, Fujisawa, and Hironori Shimamura, Yokohama, both of Japan, assignors to Nippon Electronics Memory Industry Co. Ltd., Tokyo, Japan

Filed July 9, 1975, Ser. No. 594,603

Claims priority, application Japan, Dec. 5, 1974, 49-140153

Int. Cl.² H02M 7/00

U.S. Cl. 321—45S **4 Claims**

1. A switching regulator for driving a load characterized by comprising

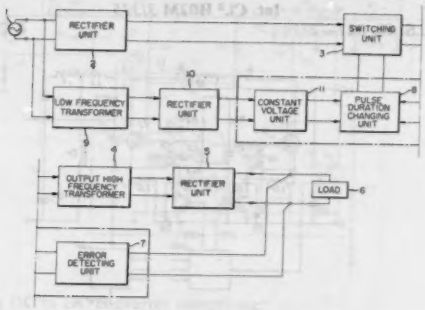
a. a power supply;

b. a pulse converter for converting the input from said power supply into the high frequency pulses;

c. an output unit for stepping up or down the voltage of the output pulses from said pulse converter and rectifying them;

d. an error detecting unit for detecting the variation in output voltage from said output unit;

e. a pulse duration changing unit for changing the pulse duration of the output pulses from said pulse converter in response to the output from said error detecting unit;



f. first biasing means for biasing, during the driving of said load, said pulse duration changing unit with the output from said output unit; and

g. a second biasing means for initially biasing said pulse duration changing unit with the power supplied from said power supply, and means responsive to the driving of said load for blocking the flow of current from said second biasing means to said pulse duration changing unit.

4,017,788

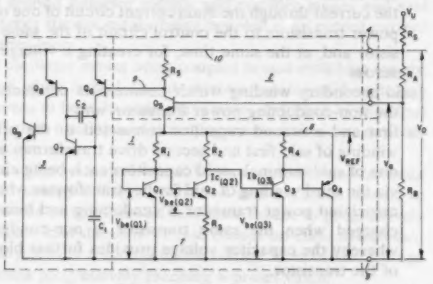
PROGRAMMABLE SHUNT VOLTAGE REGULATOR CIRCUIT

Elvin Duane Stepp, Cincinnati, Ohio, and James Reggie Talley, Dallas, Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Nov. 19, 1975, Ser. No. 633,527

Int. Cl.² G05F 1/58

U.S. Cl. 323—8 **9 Claims**



1. A shunt regulator circuit having an output terminal, a sample voltage terminal and a common terminal and comprising:

a. a reference voltage generator means having a pair of transistors driving a third transistor, each with load resistors, said load resistors being so proportioned in resistance value with respect to each other that the combined temperature coefficients of said pair of transistors is equal and opposite the temperature coefficient of said third transistor;

b. an error voltage amplifier means receiving the output of said reference voltage generator means and a voltage

from said sample voltage terminal and producing in response thereto an output indicative of any deviation of the voltage between said output terminal and said common terminal from a predetermined desired value; and

c. an active power amplifier means responsive to the output of said error voltage amplifier means to produce a change in the current through said power amplifier means whereby the voltage between said output terminal and said common terminal remains constant at said predetermined desired value.

4,017,789

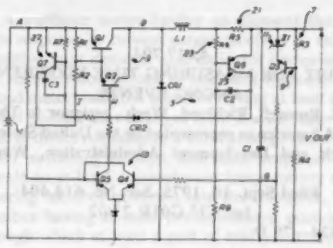
CURRENT OVERLOAD PROTECTION CIRCUIT

David Morris, Brooklyn, N.Y., assignor to Litton Business Systems, Inc., Morris Plains, N.J.

Continuation of Ser. No. 347,185, April 2, 1973, abandoned. This application Apr. 16, 1975, Ser. No. 568,486

Int. Cl.² G05F *1/56*

U.S. Cl. 323—17 **8 Claims**



1. A switching regulator for supplying energy to an output load comprising;

first coupling means for coupling a direct current input voltage source;

a series switching means, coupled to said first coupling means, having a first control terminal;

second coupling means for coupling said output load to said series switching means;

first control means, coupled to said second coupling means, for providing a first control signal which is a function of the output voltage;

first transmission means, coupled to said first control means, for separately coupling said first control signal to said first control terminal of said series switching means;

a current foldback control means for limiting the maximum output load current to a preset value and significantly decreasing the load current from said preset value as the load resistance is decreased, coupled between said series switching means and said first control means, for providing a second control signal which is a function of the output load current; and

second transmission means, coupled to said said first coupling means and coupled to said current foldback means for separately coupling said second control signal to said first control terminal.

4,017,790

ALTERNATING CURRENT POWER TRANSMISSION SYSTEMS

Erich Siegfried Friedlander, Sutton Coldfield, England, assignor to Associated Electrical Industries Limited, London, England

Filed Oct. 14, 1975, Ser. No. 621,822

Claims priority, application United Kingdom, Oct. 15, 1974, 44603/74

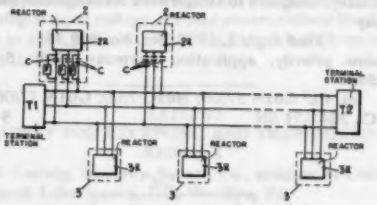
Int. Cl.² H02J *3/12*

U.S. Cl. 323—110 **11 Claims**

1. An alternating current power transmission system including:

a. a transmission line connected between a pair of mutually distant terminal stations;

b. a plurality of intermediate stations located at spaced positions along the length of the transmission line between the terminal stations;



c. a stabilising arrangement comprising a plurality of alternating current saturated reactors connected to the line at the intermediate stations;

d. at least some of said reactors having slope correction capacitors connected in series therewith; and

e. others of said reactors having slope reactances which are not compensated by series slope correction capacitors.

4,017,791

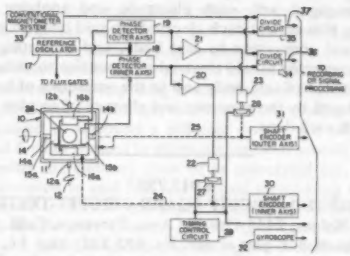
METHOD AND APPARATUS FOR MEASURING VARIATIONS IN MAGNETIC FIELD ORIENTATIONS

Robert M. Black, Ocean City, N.J., assignor to Airmag Surveys, Inc., Philadelphia, Pa.

Filed July 11, 1974, Ser. No. 487,609

Int. Cl.² G01R *33/04*

U.S. Cl. 324—43 R **22 Claims**



1. A system for measuring variations in magnetic field orientations comprising:

means for intermittently establishing a reference value for said variations, including

means for sensing field orientation, and

means for establishing the orientation of said sensing means in a predetermined angular relation to said field; and

means for measuring, during a period following each said establishment, departures from said reference value corresponding to variations in said field during the period, said measuring means including

a gimbaled platform bearing flux gates defining a plane,

means for detecting variations in the outputs of said flux gates,

intermittently operable means for utilizing said detected variations to orient said platform so as to null said variations, said intermittently operable means comprising gimbal drives for said platform controlled by said detecting means, and means for decoupling said drive means for said platform,

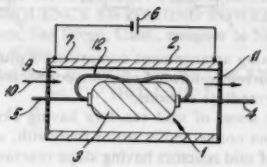
means for preserving said platform so oriented between said intermittent operations, said preserving means including a gyroscope mounted on said platform, and

means for deriving indications of said flux gate outputs between said intermittent operations.

4,017,792
DEVICE FOR DETERMINING AND/OR MEASURING ALCOHOL CONTENT IN A GAS AND METHOD OF MANUFACTURING A SEMI-CONDUCTOR BODY FOR USE IN ALCOHOL DETECTION

Gerhard Heiland, and Claus Dieter Kohl, both of Aachen, Germany, assignors to Dragerwerk Aktiengesellschaft, Germany

Filed Sept. 2, 1975, Ser. No. 609,551
Claims priority, application Germany, Sept. 5, 1974, 2442593
Int. Cl.² G01N *57/00*; H01C *7/00*; G01N *37/00*
U.S. Cl. 324—71 SN **9 Claims**

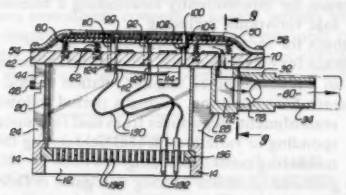


1. An alcohol presence sensor, comprising a conduit for the passage of breathing air therethrough, a heater carried by said conduit for heating the space within said conduit, a metallic oxide semiconductor body disposed within said conduit and spaced inwardly from the interior thereof so that breathing air passing through the conduit may pass thereover, said metallic oxide semiconductor body being made of zinc oxide and having a density approximating the density of a monocrystal, first and second electrodes of respective opposite polarity engaging respective opposite ends of said body, clamping means engaged with each electrode and applying a high clamping bias against each electrode to said body to establish said biased connection to said body, and indicating circuit means connected to said electrodes responsive to variations in the resistance of said body and to the variations of breathing air produced by the presence and absence of alcohol to indicate such variations.

4,017,793
PRINTED CIRCUIT BOARD CIRCUIT TESTER

Fred E. Haines, 2444 Cabrillo Ave., Torrance, Calif. 90501

Continuation-in-part of Ser. No. 603,332, Aug. 11, 1975, abandoned. This application July 6, 1976, Ser. No. 702,881
Int. Cl.² G01R *31/02*, *15/12*
U.S. Cl. 324—73 PC **20 Claims**

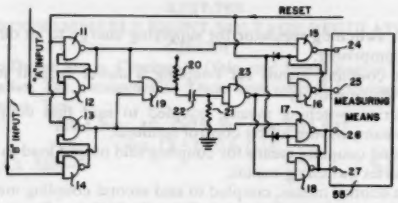


1. A printed circuit board circuit tester comprising: a vacuum chamber, a vacuum source connection to said chamber, a chamber base, vacuum operable means defining a part of said chamber, supporting means in said chamber associated with said vacuum operable means, internal flexible means in said chamber supporting said supporting means and said vacuum operable means away from said base, external flexible means outwardly of said chamber associated with said vacuum operable means, spacing flexible means on said external flexible means having an opening therethrough, said spacing flexible means being adapted to support a printed circuit board to be tested, said opening in said spacing flexible means being adapted to permit the circuits to be tested to be in communication with said external flexible means, electrical contacts secured to and extending through both sides of said base, and openings through said supporting means, through said vacuum operable means, and through said external flexible means being in respective alignment, one end of each electrical contact being adapted to extend into said vacuum chamber, into a respective said opening through said supporting means, into a respective said opening through said vacuum operable means and into a respective said opening through said external flexible means, whereby when a vacuum is applied to said chamber, a printed circuit board, supported on said spacing flexible means and in communication with said external flexible means, is moved toward said base with said external flexible means, said vacuum operable means, and said supporting means, so that the circuits on said board make predetermined contact with said electrical contacts.

4,017,794
CIRCUIT FOR MEASURING TIME DIFFERENCES AMONG EVENTS

Delwin M. Romrell, Richland, Wash., assignor to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed Sept. 18, 1975, Ser. No. 614,404
Int. Cl.² G01R *23/02*
U.S. Cl. 324—78 D **3 Claims**



1. A circuit for measuring time differences between randomly arriving signals comprising:

a. a first latch having a first stable state and a second stable state;

b. a second latch having a first stable state and a second stable state;

c. reset means connected to said first and second latches for resetting said first latch to said first stable state and said second latch to said first stable state;

d. operating means connected to said first and second latches and responsive to an input to one of said first and second latches after said first and second latches are reset to cause said one of said first and second latches to maintain said first stable state and to cause the other of said first and second latches to change to said second stable state;

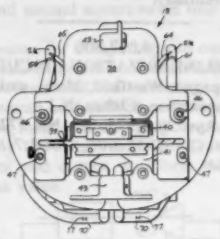
e. return means connected to said first and second latches and responsive to a later input to the other of said first and second latches to cause the other of said latches to return to said first stable state;

f. measuring means connected to said first and second latches and responsive to said changes from said first stable states to said second stable states to determine which of said first and second latches first changed states, which next changed states, and the time between said changes of state, which determination provides a measure of which latch first received a signal and the time between receipt of a signal at a first latch and at a second latch.

4,017,795
HEAT SENSITIVE FAULT DETECTING AND INDICATING SYSTEM FOR WATTHOUR METER

James W. Milligan, West Lafayette, Ind., assignor to Duncan Electric Company, Inc., Lafayette, Ind.

Filed June 9, 1975, Ser. No. 585,110
Int. Cl.[2] G01R 1/36
U.S. Cl. 324—110 10 Claims



1. In a watthour meter having an element that becomes heated in response to current surges received by said meter, a heat sensitive fault detector and indicator comprising:

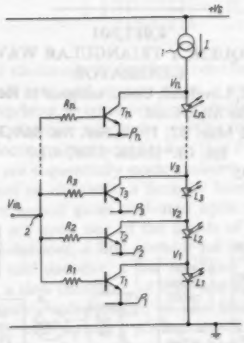
a first member contiguous to said heat responsive element in said meter, said first member having at least a predetermined portion that changes from a solid state to a liquid state in direct response to a current surge received by said meter sufficient to heat said heat responsive element therein to at least a preselected temperature; and

a covering member covering said first member, said cover member having at least predetermined portions thereof through which at least a part of said predetermined portions of said first member protrude to visually indicate a possible fault at said covering member when said first member is caused to change from solid state to liquid state.

4,017,796
ELECTRICAL CIRCUIT MEANS FOR USE IN ANALOGUE DISPLAY AND/OR CONTROL SYSTEMS

Martin B. Tobias, 43, Shakespeare Road, St. Ives, Huntingdon PE17 4TT, England

Filed Jan. 27, 1975, Ser. No. 544,366
Claims priority, application United Kingdom, Jan. 29, 1974, 4013/74
Int. Cl.[2] G01R 19/00, 19/16
U.S. Cl. 324—122 14 Claims

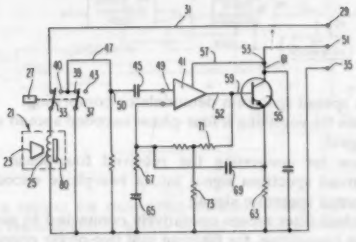


1. Electrical circuit means comprising a plurality of radiation emitting diodes connected in electrical relationship for the passage of electrical current successively therethrough, means for connecting the radiation emitting diodes in series with a source of direct constant current, current diverting paths respectively connected with the radiation emitting diodes, a semiconductor device disposed in each current diverting path, means for applying a control voltage in the form of an analogue input voltage to the semiconductor devices, and means independent of the radiation emitting diodes for biasing each semiconductor device to effect conduction of the current diverting path associated therewith at a predetermined level of the analogue input voltage, the said predetermined level being unique to each path and increasing successively from one to the next path.

4,017,797
HEADSET FOR RECEIVING AND TRANSMITTING SIGNALS

John D. Laessig, Newtown Square, Pa., assignor to Columbia Research Laboratories, Inc., Woodlyn, Pa.

Filed Feb. 5, 1975, Ser. No. 547,184
Int. Cl.[2] H04B 1/44; H04M 1/05
U.S. Cl. 325—16 6 Claims

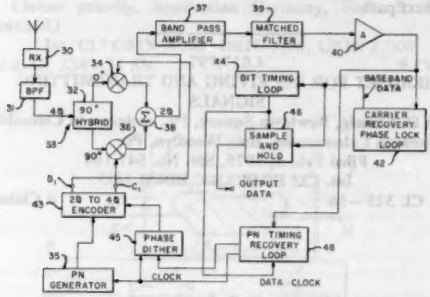


1. A device for attenuating ambient sounds attempting to enter the auditory canals of the ears of a user and for transmitting and receiving audio signals to and from at least one ear of the user which audio signals provide a basis of communication with a remote site comprising in combination: first and second sound attenuating members, said sound attenuating members each formed to surround a different one of the ears of said user and further formed to attenuate ambient sounds attempting to enter the auditory canal of its associated ear; securing means coupled to said first and second attenuating members and formed to secure said sound attenuating members over the ears of said user; a unitary, sound signal transducer means disposed in said first sound attenuating member so as to avoid coming in direct contact with the user's head and formed and disposed in said first sound attenuating member to receive sound signals generated by the larynx of said user and emanating from the auditory canal of the ear, of said user, surrounded by said first sound attenuating member in order to generate first electrical signals in response to said received sound signals, said unitary, sound signal transducer further formed and disposed to receive second electrical signals from a remote location and generate audio signals in response to said second electrical signals to be transmitted to the eardrums of said user; switching means located less than 1.5 inches from and connected to said unitary sound signal transducer means, said switching means formed to provide a first signal path or said first electrical signals generated by said unitary, sound signal transducer means and to provide a second signal path for said second electrical signals; high gain amplification circuitry means disposed in said first sound attenuating member less than 1.5 inches from said switching means and 1.5 inches or less from said unitary sound signal transducer means and connected to said first signal path whereby the circuit, from said unitary, sound signal transducer means, including said first signal path and said amplification circuitry is characterized by being a high gain-low noise circuit; and circuitry means connected to said high gain amplification means and adapted to transmit amplified electrical signals therefrom to a remote location.

4,017,798
SPREAD SPECTRUM DEMODULATOR

Robert S. Gordy, Largo; Alfred T. Anderson, and David E. Sanders, both of St. Petersburg, all of Fla., assignors to NCR Corporation, Dayton, Ohio

Filed Sept. 8, 1975, Ser. No. 611,367
Int. Cl.² H04B 1/62
U.S. Cl. 325—42 14 Claims



7. A spread spectrum demodulator comprising:

means for receiving a four-phase encoded spread spectrum signal;

means for converting the received four-phase encoded spread spectrum signal into a two-phase encoded non-spread spectrum signal;

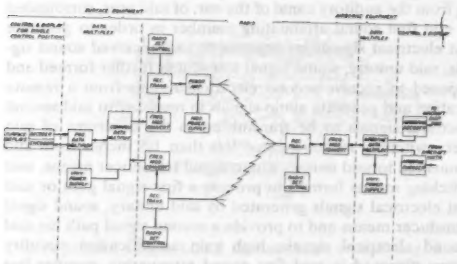
matched filter means operatively connected to said means for converting, for filtering said two-phase encoded non-spread spectrum signal so as to filter all but desired signal components from said signal; and

carrier recovery means responsive to the filtered signal from said matched filter for demodulating said signal to provide a decoded baseband signal.

4,017,799
HIGH SPEED MULTIPLEX DATA TRANSMISSION SYSTEM

David F. Burdett, Glen Ridge, and Doren Mitchell, Martinsville, both of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Apr. 12, 1960, Ser. No. 21,836
Int. Cl.² H04J 6/00
U.S. Cl. 325—55 7 Claims

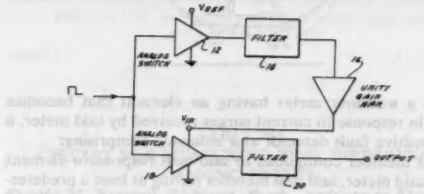


5. A high-speed data transmission system comprising a central station, a plurality of control positions connected to said central station, a transmitter connected to said central station, an individual mobile station for each of said positions, means at said central station for polling all of said control positions to find any of said positions which is ready to transmit to its individual mobile station, means at said central station, responsive to the finding of a control position which is ready to transmit, for connecting it to said transmitter, means in a control position connected to a transmitter for selectively directing intelligence to its individual mobile station, timng means at said central station for directing a reply from a selectively addressed mobile station to its individual control position after a measured interval and means at said central station, responsive to the elapse of said interval and the non-reception of a reply by any control position from its individual mobile station, for connecting that control position to said transmitter preferentially.

4,017,800
DELINEARIZATION CIRCUIT

Ronald E. Champagne, Westfield, Mass., assignor to General Instrument Corporation, Clifton, N.J.

Filed Apr. 29, 1975, Ser. No. 572,763
Int. Cl.² H03J 3/06; G06G 7/18
U.S. Cl. 325—464 13 Claims



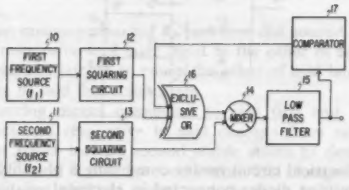
1. A delinearization circuit comprising first switch means switchable, in accordance with an input signal, between a given voltage and a reference voltage to form a first signal, means for forming from said first signal an intermediate signal which is a function of said first signal, and second switch means switchable, in accordance with said input signal, between said intermediate signal and a reference signal, to form an output signal.

7. An electronic tuning apparatus for use in a tuner or the like of the type having a tuning signal controlled tuning element, said apparatus comprising input signal generating means, a memory having a plurality of data storage locations, control means operatively connected to said input signal generating means for addressing a location in said memory in accordance with the generation of an input signal and for controlling data flow from said addressed location, means operatively connected to said memory for generating a signal variable in accordance with the data at said addressed location, means for delinearizing said variable signal to form a delinearized signal and means for forming the tuning signal from said delinearized signal.

4,017,801
LOW FREQUENCY TRIANGULAR WAVEFORM GENERATOR

Ronald J. Riedel, Loveland, Colo., assignor to Hewlett-Packard Company, Palo Alto, Calif.

Filed Mar. 22, 1976, Ser. No. 669,375
Int. Cl.² H03K 5/08, 4/10
U.S. Cl. 328—35 5 Claims



1. A circuit for generating sawtooth waveforms, the circuit comprising:

first squarewave generating means for providing a first squarewave of frequency f_1;

second squarewave generating means for providing a second squarewave of frequency f_2, said second squarewave having a linearly changing phase difference with respect to said first squarewave;

linear phase detector means responsive to said first and second squarewave generating means for linearly transforming the linearly changing phase difference between said first and second squarewaves into an output waveform;

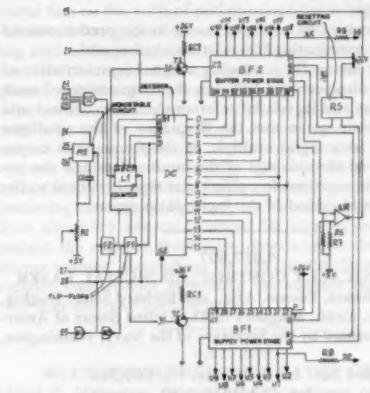
comparator means for comparing said output waveform of said linear phase detector to a desired peak value for the output waveform and for detecting when said output waveform equals said desired peak value; and

phase reversing means for changing the phase of said output waveform by 180° when said comparator means detects the value of said output waveform to be equal to the desired peak value.

4,017,802
STORED ELECTRONIC DEVICE FOR PRODUCING PULSES HAVING PREDETERMINED RATE AND SEQUENCE

Francesco Ferrarin, Milan, Italy, assignor to Societa' Italiana Materiali Pressati Resinati e Simili - S.I.M.P.R.E.S. - S.r.l., Milan, Italy

Filed July 17, 1975, Ser. No. 596,624
Claims priority, application Italy, July 24, 1974, 25518/74
Int. Cl.² H03K *17/02, 13/247*
U.S. Cl. 328—130 **9 Claims**

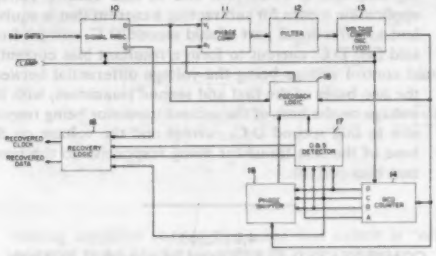


1. A stored electronic device for producing pulses having a predetermined rate and sequence on a number of output channels comprising, in combination, a single input connected to an associated power supply for starting the device, a selector for preselecting a number of pulses that for each operation of the device are sequentially made available on the respective output channel or channels, a decoder having a plurality of channels, two logical gates activated upon operation of the device which act upon one of the inputs of said decoder for blocking said decoder, a first counter for supplying scanning sequences to said decoder, a fast oscillator acting upon said first counter, a slow oscillator, at least one buffer power stage having a memory independent of any interruption in said power supply, said memory having inputs which are connected to said decoder, and outputs which form the output channels of the device, said memory in said buffer stage being arranged to block said fast oscillator and release said slow oscillator for determining the pulse rate, a plurality of logical gates, a second counter for supplying respective signals to said logical gates each for selecting a number of pulses to activate a gate which is preselected by said selector, an inverter switch for receiving a signal from said activated logical gate to provide a pulse blocking said slow oscillator a resetting circuit arranged to be actuated when the last output channel is activated to bring said memory back to an initial state and means for connecting said memory to said slow oscillator and to said second counter.

4,017,803
DATA RECOVERY SYSTEM RESISTANT TO FREQUENCY DEVIATIONS

Kenneth L. Baker, Norristown, Pa., assignor to Sperry Rand Corporation, New York, N.Y.

Filed Jan. 29, 1976, Ser. No. 653,410
Int. Cl.² H03D *3/18*
U.S. Cl. 329—104 **25 Claims**



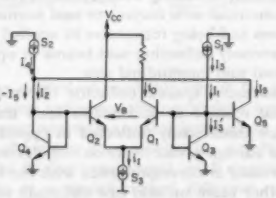
1. In a system for recovering encoded binary information which is represented in a data stream at time positions recurring at a frequency that is nominally predetermined but subject to uncontrollable deviations, the system including means for generating signals having alternating high and low portions for use as recovery windows, recovery logic supplied with said windows, and a phase locked oscillator loop controlled by a phase comparator and determining the times of occurrence of the windows, the phase comparator having supplied to it two comparison signals, one being the feedback signal within the loop and the other being a signal derived from the data stream, the improvement which comprises

means for supplying to the recovery logic a signal also derived from the data stream and having information representative time-varying characteristics which occur substantially concurrently with corresponding time-varying characteristics of the said signal derived from the data stream which is supplied to the phase comparator, and which do so occur substantially independently of said frequency deviations.

4,017,804
BROAD BAND VARIABLE GAIN AMPLIFIER

Dan M. Hunsinger, San Jose, Calif., assignor to Hewlett-Packard Company, Palo Alto, Calif.

Filed Dec. 5, 1975, Ser. No. 637,910
Int. Cl.² H03G *3/30;* **H03F** *3/45*
U.S. Cl. 330—29 **8 Claims**



1. A broad band variable gain amplifier comprising:

a first and a second transistor, each having an emitter, a collector and a base, said first and second transistors are connected differentially with the emitters of each of the transistors connected together with the amplifier output signal being selected as the collector current of the second transistor;

input current means coupled to the emitters of the first and second transistors for applying an input current thereto;

control voltage application means connected to the bases of the first and second transistors for applying a control voltage between the bases of these transistors to control the gain of the first and second transistors;

means for receiving a first and a second D.C. current, each current being coupled to the control voltage application means, for biasing and controlling the gain of the first and second transistors; and

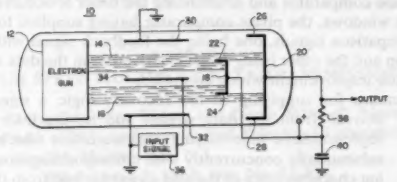
current subtracting means coupled to the means for receiving said first D.C. current and to said control voltage application means for subtracting a current that is equivalent to a fractional part of said second D.C. current from said first D.C. current to form a resultant bias current;

said control voltage being the voltage differential between the two bases of the first and second transistors, with the voltage on the base of the second transistor being responsive to said second D.C. current and the voltage on the base of the first transistor being responsive to the resultant bias current.

4,017,805
COMPENSATED ELECTRON BEAM DEFLECTION DEVICE

Herbert M. Wagner, Belmar, N.J., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Jan. 8, 1976, Ser. No. 647,684
Int. Cl.² H03F 3/10, 3/54
U.S. Cl. 330—33 **15 Claims**



1. An electron beam deflection amplifier comprising:

means for generating a pair of like spaced parallel longitudinal electron beams, said beams being normally positioned symmetrically about a longitudinal axis;

a pair of longitudinally spaced collector electrodes, each of said electrodes being disposed symmetrically about said longitudinal axis and across the path of both beams to intercept respective portions of each of said beams;

output means responsive to the outputs of said collector electrodes to produce an output current;

electrode means extending axially intermediate said beams and symmetrical with respect to said normal position of said beams and being responsive to applied input signals for transversely deflecting said beams in opposite directions about said longitudinal axis;

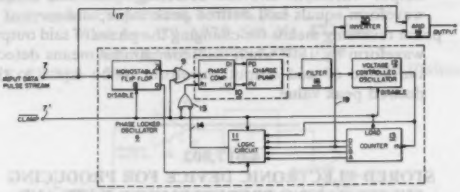
said longitudinally spaced collector electrodes being so positioned relative to said beams such that when said beams are transversely deflected in opposite directions the beam current of one beam on one electrode increases and decreases in correspondence with the beam current of the other beam on said one electrode so that the respective collector electrode beam currents due to both beams are additive at each of said electrodes; and

when said beams move transversely in the same direction the beam current of one beam on one electrode changes oppositely from the beam current of the other beam on said one electrode so that the respective collector beam currents due to both beams are negated at each of said electrodes.

4,017,806
PHASE LOCKED OSCILLATOR

Bruce J. Rogers, Collegeville, Pa., assignor to Sperry Rand Corporation, New York, N.Y.

Filed Jan. 26, 1976, Ser. No. 652,369
Int. Cl.² H03B 3/04
U.S. Cl. 331—1 A **10 Claims**



1. A phase locked oscillator comprising:

means for supplying in response to an input pulse stream a series of input pulses each of predetermined duration,

controllable oscillator means for providing a series of oscillator pulses,

means for providing an asymetric cyclic pulse signal including a counter responsive to the oscillator pulses for repetitively counting to a predetermined count,

means responsive to a first count in the predetermined count for generating a reference pulse in response to an input pulse,

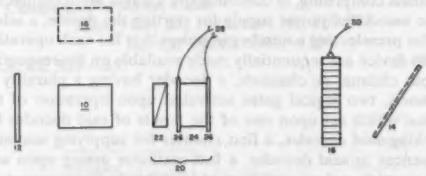
means responsive to a second count in the predetermined count for terminating the reference pulse, and

comparator means for producing a signal representative of the time displacement between the termination of each input pulse and its related reference pulse to control said oscillator means so that the frequency of the oscillator pulses is an integral multiple of the frequencies corresponding to the spacings of the input pulses and the period of the asymmetric cyclic pulse signal is equal to the fundamental period of the input pulse stream.

4,017,807
ELECTRONICALLY CONTROLLED DIGITAL LASER

Lynn D. Hutcheson, Tucson, Ariz., and Richard Swart Hughes, China Lake, Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Feb. 23, 1976, Ser. No. 660,586
Int. Cl.² H01S 3/10
U.S. Cl. 331—94.5 C **4 Claims**



1. An electronically controlled digital laser comprising:

a resonant laser cavity having a lasing cell, and bounded at one end by a laser output mirror;

a reflective grating positioned angularly for retroreflecting those wavelengths that are incident thereon at the retroreflective angle unique to each wavelength, said reflective grating being located at the end of said cavity opposite to said output mirror;

means for deflecting an intracavity laser beam in response to an electrical signal, said deflecting means located in said cavity adjacent said retroreflecting means;

an electronically tunable bandpass filter located in said cavity adjacent said lasing cell and in optical alignment therewith; and

means for tuning the passband of said filter.

4,017,808

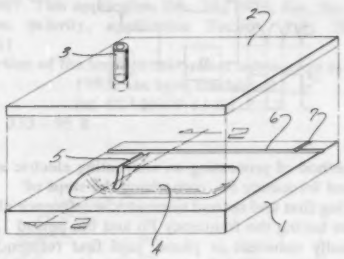
GAS LASER WITH SPUTTER-RESISTANT CATHODE

Michael E. Fein, Toledo, and Charles W. Salisbury, Rising Sun, both of Ohio, assignors to Owens-Illinois, Inc., Toledo, Ohio

Filed Feb. 10, 1975, Ser. No. 548,307

Int. Cl.² H01S *3/03*

U.S. Cl. 331—94.5 T **5 Claims**



1. In a gaseous laser device comprising an envelope, a cathode volume, an anode volume, a cathode electrode within said cathode volume and formed as a thin adherent conductive metal film on the walls of said envelope bounding said cathode volume, a lasing gaseous volume, a cathode channel connecting said cathode volume to said lasing gaseous volume, an anode within said anode volume, and means for igniting a gaseous discharge between the anode and cathode and wherein the cathode has a relatively large area and at least one edge adjacent to said cathode connecting channel which is subject to gas discharge deterioration, the improvement wherein said at least one edge of said relatively large area cathode adjacent said cathode connecting channel has an insulating coating applied only on the said edge thereof and from about 0.1 micron to about 50 microns in thickness to protect the cathode from edge deterioration due to gas discharge without diminishing the effective surface area of said cathode and without increasing the average current density over said effective surface area.

4,017,809

MULTI-FREQUENCY OSCILLATOR CIRCUIT

Lionel P. Melancon, Oxnard, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Division of Ser. No. 528,595, Dec. 2, 1974, Pat. No. 3,924,262. This application July 25, 1975, Ser. No. 599,253

Int. Cl.² H03B *5/24*

U.S. Cl. 331—179 **2 Claims**

1. An oscillator circuit capable of generating a first or second a-c signal in response to a first and second switch comprising:

a. a first inverting amplifier having an input and an output, said first inverting amplifier input being connected to said first switch;

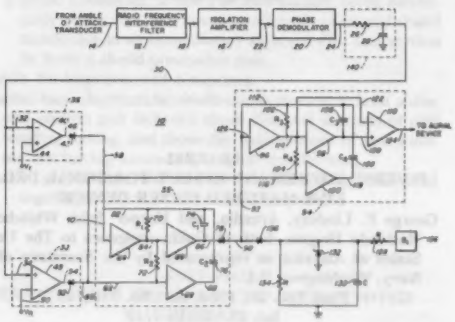
b. a first resistance network being connected between said first inverting amplifier input and said first inverting amplifier output;

c. a second inverting amplifier having an input and an output, said second inverting amplifier input being connected to said first inverting amplifier output, said first or second a-c signal appearing on said second inverting amplifier output;

d. a first capacitance circuit being connected between said first inverting amplifier input and said second inverting amplifier output;

e. a third inverting amplifier having an input and an output;

f. a second capacitance circuit being connected between said first inverting amplifier input and said third inverting amplifier output, said first and second capacitance circuit and said first resistance network determining the time constant for the frequency of oscillation of said first a-c signal, said first a-c signal appearing on said second inverting amplifier output when said first switch is "off" and said second switch is "off";



g. a second resistance network being connected between said first inverting amplifier output and said third inverting amplifier input; and

h. means connected to said third inverting amplifier for electrically removing said second capacitance circuit from said oscillator circuit when said first switch is "off" and said second switch is "on", thereby causing said second a-c signal to appear on said second inverting amplifier output.

4,017,810

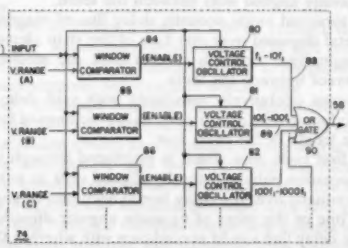
VOLTAGE CONTROLLED OSCILLATOR

Sotirios John Vahaviolos, East Windsor Township, Mercer County, N.J., assignor to Western Electric Company, Inc., New York, N.Y.

Division of Ser. No. 592,437, July 2, 1975, Pat. No. 3,965,726. This application Apr. 1, 1976, Ser. No. 672,825

Int. Cl.² G01R *19/26;* **H03K** *7/06*

U.S. Cl. 332—14 **4 Claims**



1. A voltage controlled oscillator circuit for receiving an analog input signal and generating an output frequency which is linearly proportional to the analog input signal, comprising:

a plurality of window comparators for simultaneously receiving the analog input signal, each comparator being responsive to a predetermined different range of the maximum analog input signal amplitude to generate an enable signal; and

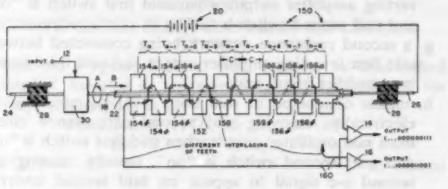
a plurality of voltage control oscillators, for simultaneously receiving the analog input signal, each oscillator being

responsive to the enable signal from a different one of the window comparators to generate a frequency-modulated output signal which is linearly proportional to the analog input signal within the predetermined range.

4,017,811
INVERSE WIEDEMANN EFFECT TORSIONAL DELAY LINE MATCHED FILTER DEVICE

George F. Lindsay, Arcadia, and Harper John Whitehouse, Hacienda Heights, both of Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Feb. 28, 1968, Ser. No. 710,705
Int. Cl.² H03H *7/30*
U.S. Cl. 333—30 M **5 Claims**



1. In a torsional delay line signal processing device of the type having a matched filter response characteristic corresponding to a first predetermined sequence of N binary digits, where N is a numerical value in excess of 100, the combination comprising;

a. an elongated tooth-edged strip element of non-magnetic, conductive metal, said element having laterally aligned, uniformly spaced, teeth formed along each edge thereof, said element having N + 1 pairs of laterally aligned teeth along its length forming a linear sequence of N pairs of laterally aligned slots between the teeth,

b. a torsional mode acoustic delay line of magneto-elastic metal disposed over one face of the strip element in the longitudinal direction thereof over the median portion thereof between the teeth,

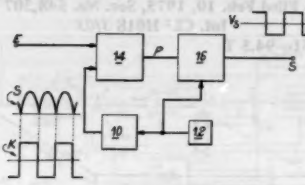
c. means operatively associated with said delay line for producing a field of circular magnetic lines of force about the length of the delay line,

d. a first code wire which is interlaced through individual successive pairs of laterally aligned slots to pass circumferentially over the delay line at each pair of aligned slots in one or the other of opposite angular directions about the delay line axis in accordance with whether the digit in the corresponding bit position of said first sequence of N binary bits is a 0 or a 1, where the wire is to pass over the delay line at the next slot in the same angular direction said wire being interlaced from one to the next of the successive laterally aligned slots by being helically passed around the median portion of the other face of the tooth-edged strip element, where the wire is to be passed over the delay line at the next slot in the opposite angular direction said wire being passed over a tooth at the other face of the tooth-edged strip in a direction parallel to the strip element.

4,017,812
METHOD OF PROCESSING A SIGNAL, AND CORRESPONDING DEVICES

Jean-Paul Bonnefoy-Claudet, St-Martin d'Heres; Michel Martin, Eybens, and Edmond Tournier, Grenoble, all of France, assignors to Commissariat a l'Energie Atomique, Paris, France

Filed July 31, 1975, Ser. No. 600,273
Claims priority, application France, Aug. 2, 1974, 74.26992
Int. Cl.² H03H *7/28;* **H03D** *3/18;* **H03H** *7/15, 7/50*
U.S. Cl. 333—70 A **14 Claims**



1. A method of processing an alternating electric signal of an assigned frequency Fo, comprising the steps of:

producing first and second symmetrical reference electrical waves having the frequency Fo and the period 1/Fo and mutually coherent in phase, said first reference wave being a non-rectangular wave and said second reference wave being a rectangular wave;

producing an auxiliary signal having the period ½ Fo by rectifying said first reference wave;

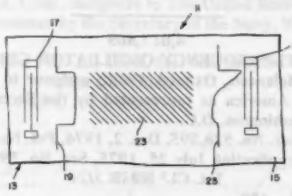
multiplying the signal to be processed by said auxiliary signal in an electronic multiplier; and

isosynchronously processing the output of said multiplier at the frequency Fo in a synchronous chopper-integrator circuit switched by said second reference wave and arranged for separately and successively integrating alternate sequences of ½ Fo periods of said multiplier output.

4,017,813
SURFACE ACOUSTIC WAVE NOTCH FILTER

Oberdan W. Otto, Los Angeles, Calif., assignor to Hughes Aircraft Company, Culver City, Calif.

Filed Apr. 5, 1976, Ser. No. 673,322
Int. Cl.² H03H *9/26, 9/30;* **H01L** *41/04*
U.S. Cl. 333—72 **1 Claim**



1. A surface acoustic wave notch filter, comprising:

a surface acoustic wave delay line including a substrate of material capable of supporting propagating surface acoustic wave energy and including spaced input and output transducers disposed on said substrate, said input transducer converting electromagnetic energy to a beam of surface acoustic wave energy having a surface displacement beam profile and propagating in said substrate along a predetermined path toward said output transducer; and

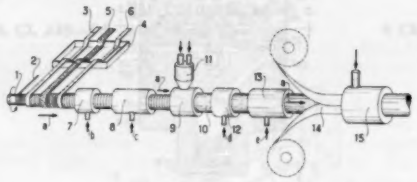
synchronous reflection means including a periodic angled reflective array having a synchronous reflection frequency and disposed on said substrate in said predeter-

mined path for distorting said beam profile of said beam and causing selective portions thereof adjacent said synchronous reflection frequency to be out of phase with the remainder of said beam profile, said beam profile being amplitude averaged at said output transducer to provide thereat an output signal having a relatively deep notch in amplitude at said synchronous reflection frequency.

4,017,814
WAVE GUIDE AND METHOD FOR THE MANUFACTURING THEREOF

Marcel Aupoix, Paris, and Jean-Pierre Trezeguet, Venissieux, both of France, assignors to Les Cables de Lyon, Lyon Cedex, France

Division of Ser. No. 569,428, April 18, 1975, Pat. No. 3,952,407. This application Dec. 19, 1975, Ser. No. 642,630
Claims priority, application France, Apr. 25, 1974, 74.14461
The portion of the term of this patent subsequent to Apr. 27, 1993, has been disclaimed.
Int. Cl.² H01P *11/00, 3/12*
U.S. Cl. 333—95 R **4 Claims**

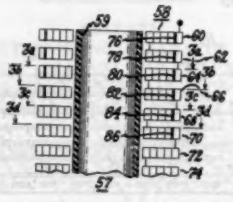


1. In a wave guide comprising a hollow conductor and a casing covering said conductor, the improvement wherein said casing comprises layers of porous dielectric and conductive materials in a resinous compound connecting said layers together and to said hollow conductor, said casing being manufactured by, in sequence, impregnating said layers of porous dielectric and conductive materials with an unhardened resinous compound and hardening said resinous compound at ambient temperature and in a few seconds by contacting said resinous compound with a catalyst diluted and borne by a gas, such that the hollow conductor is free of deformation due to hardening of the resin.

4,017,815
IMPULSE VOLTAGE DISTRIBUTION IMPROVING PARTIAL-TURN ELECTROSTATIC SHIELDS FOR DISC WINDINGS

George E. Sauer, Stockbridge, Mass., assignor to General Electric Company

Filed Sept. 27, 1976, Ser. No. 727,299
Int. Cl.² H01F *15/04*
U.S. Cl. 336—70 **6 Claims**



1. Improved electrostatic shielding for inductive apparatus of the type having,

a winding, including a plurality of generally coaxially disposed annular disc coil sections, each of said coil sections having a plurality of insulated conductor turns, each of said conductor turns having at least one strand;

spirally wound, in the same direction, alternately radially inward and radially outward,

a finish-end of a disc coil section being connected to a start-end of an immediately adjacent disc coil section for form a winding connected in an electrical series circuit relation,

electrostatic shield conductors in less than all of said disc coil sections forming a winding having a portion with, and a portion without electrostatic shield conductors,

a shield conductor in one disc coil section being electrically connected to a correspondingly positioned shield conductor in an immediatley adjacent disc coil section to form a shield conductor pair,

wherein the improvement comprises:

partial-turn electrostatic shield conductors in at least a disc coil section pair between those disc coil sections of said winding having, and those disc coil sections of said winding not having electrostatic shield conductors,

said partial-turn electrostatic shields being connected together to form shield conductor pairs.

4,017,816
FERRULE FUSE TERMINAL CLIP WITH PIVOTED REJECTOR

William R. Latimer, Jr., Bellefontaine, Ohio, assignor to I-T-E Imperial Corporation, Spring House, Pa.

Filed Dec. 29, 1975, Ser. No. 644,577
Int. Cl.² H01H *85/14*
U.S. Cl. 337—227 **4 Claims**

1. A fuse terminal clip forming an electrical connection to fuse means including a cylindrical ferrule end terminal having an annular groove recessed therein, said fuse terminal clip comprising:

space means including a pair of spaced contact legs for electrically contacting opposed portions of said terminal, said spaced contacting means adapted to resiliently capture said terminal between said contact legs;

a generally U-shaped rejection member supported on and extending between said spaced contact legs, and cooperating with said groove for rejecting a ferrule end terminal lacking said groove and for facilitating insertion and capture between said spaced means only of a fuse means having a ferrule end terminal provided with said groove means; said rejection member comprising a single stamping from sheet material and including arms spaced by a distance greater than the diameter of said annular groove and less than the diameter of said cylindrical ferrule end terminal; said rejection member also including a pair of aligned pivot arms extending in opposite directions from said arms through aligned apertures in said contact legs whereby said contact legs support said pivot arms for tilting of said rejection member; and

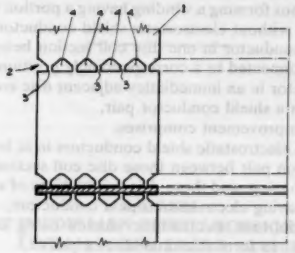
said pivot arms having their ends outboard of said contact legs peened over to provide the sole means for preventing the removal of said rejection member from said spaced contacting means.

4,017,817

FUSE STRIPS

Pierluigi Ranzanigo, Brescia, Italy, assignor to Bassani Ticino S.p.A., Milan, Italy

Filed July 9, 1975, Ser. No. 594,284
Claims priority, application Italy, July 16, 1974, 25194/74
Int. Cl.² H01H *85/04*
U.S. Cl. 337—290 **11 Claims**



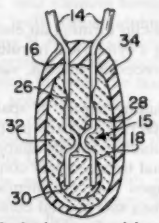
1. A fuse strip, particularly of the type used in protecting electrical circuits from overloads, comprising an elongated strip-shaped body; two spaced apart substantially parallel rows extending transversely of the elongation of said body, each row being composed of a plurality of apertures successive ones of which respectively delimiting with each other current-carrying portions; and a strip of fuse metal secured on said body in the space intermediate said rows, and overlying said body in direction transversely of the elongation of the latter so that each of said current-carrying portions is provided with substantially identical current-carrying capability.

4,017,818

THERMAL SWITCH DEVICE AND METHOD OF MAKING

Charles Calvin Rayburn, Mount Prospect, Ill., assignor to Illinois Tool Works Inc., Chicago, Ill.

Filed Dec. 22, 1975, Ser. No. 642,650
Int. Cl.² H01H *37/76*
U.S. Cl. 337—403 **16 Claims**



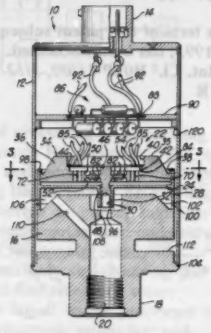
1. A thermal switch device comprising a pair of electrical conductor wire members in side by side relationship to each other and having free ends extending generally in the same direction forming switch sections and lead wire sections, the switch section including a localized contact region providing an electrically conductive path between the wire members, at least one of said conductor wire members in the switch section including a spring means biasing the contact regions and adjacent portions of the pair of conductor wire members away from each other, the free extremities, contact region and at least a portion of the spring means being encapsulated with a nonconductive heat fusible material with the conductor wires being held, against the spring bias, into electrical contact with each other, by the encapsulating material, the nonconductive heat fusible material and portions of the conductor wire adjacent the spring means which extend out of the encapsulated material being conformally coated with a rigid insulating material to totally encapsulate the heat fusible material and space and electrically insulate the extending lead wire sections from each other, wherein the conductor wires of the encased switch section are adapted to spring away from and out of contact from each other at the contact region when the heat fusible material is subjected to a predetermined temperature level causing it to flow and release the energy stored in the spring means.

4,017,819

PRESSURE TRANSDUCER

Hsia-Si Pien, New Fairfield, Conn., assignor to Consolidated Controls Corporation, Bethel, Conn.

Filed Jan. 13, 1975, Ser. No. 540,510
Int. Cl.² G01L *1/22*
U.S. Cl. 338—4 **8 Claims**



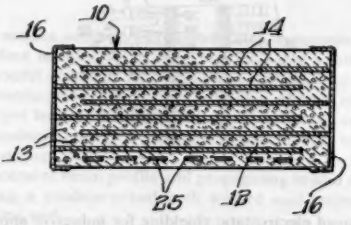
1. A unitary force measuring beam assembly comprising,
a fixed beam support member,
a deflectable beam,
means for applying a force to be measured to the center of said beam,
and means for symmetrically and floatingly mounting said beam to said beam support member, said last named means comprising a pair of torsionally flexible mounting elements connected between the opposite ends of said beam and said beam support member and extending in planes perpendicular to the plane of said beam.

4,017,820

HUMIDITY SENSOR WITH MULTIPLE ELECTRODE LAYERS SEPARATED BY A POROUS MONOLITHIC CERAMIC DIELECTRIC STRUCTURE

Bernd Ross, San Diego, Calif., assignor to Illinois Tool Works Inc., Chicago, Ill.

Continuation-in-part of Ser. No. 599,196, July 25, 1975, abandoned. This application May 13, 1976, Ser. No. 685,837
Int. Cl.² H01L *7/00*
U.S. Cl. 338—35 **2 Claims**



1. A multi-layered device for sensing humidity comprising a homogeneous porous monolithic dielectric structure, a plural-

ity of electric field-producing electrode layers stacked in planes one above each other which extend substantially entirely across two dimensions of said device and which are buried into said dielectric structure with alternating ones of said electrode layers being connected to separate conductive terminals and with said electrodes being separated by said dielectric structure, which structure is formed with at least a ten percent open cell construction wherein the dielectric is comprised of:

Magnesium titanate ($MgTiO_3$)	65%–75% by weight
Zinc oxide (ZnO)	10%–20% by weight
Calcium titanate ($CaTiO_3$)	4%–7% by weight
Titanium dioxide (TiO_2)	6%–9% by weight.

4,017,821

CIRCUIT ASSEMBLY AS FOR A T-ELEMENT

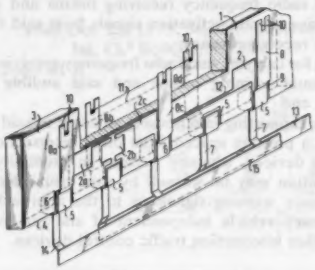
Gerhard Schmidt, Emmering, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Dec. 1, 1975, Ser. No. 636,428

Claims priority, application Germany, Dec. 6, 1974, 2457868

Int. Cl.² H01C *10/06*

U.S. Cl. 338—95 **6 Claims**



1. A circuit assembly comprising a substantially rectangular substrate having circuit elements which are applied by the film circuit technique to at least one of its large surfaces, and a plurality of longitudinally spaced-apart, clamp-like contact elements each having clamping flanks which embrace an edge of said substrate, said contact elements forming electric connections to the circuit elements and affording mechanical connections of the substrate to a carrier plate, wherein:

at least one of the flanks of each contact element is extended to form a contact arm which extends in spaced, parallel relation to the substrate to a free end; and

fork means provided on the free ends of the contact arms receive in electrical contact at least one wire bridge extending between two of said contact arms.

4,017,822

BEARING DETERMINING APPARATUS INCLUDING SINGLE CHANNEL MULTIPLEXING

William T. Rusch, Hollis, N.H., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Nov. 24, 1969, Ser. No. 886,602

Int. Cl.² G01S *3/80*

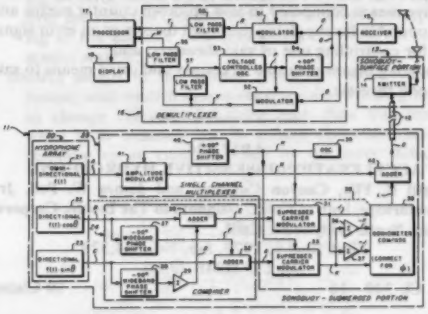
U.S. Cl. 340—2 **10 Claims**

1. In a system for determining the bearing of a remotely located acoustic signal source, apparatus comprising:

a surface sonobuoy portion;

a submergible sonobuoy portion including a hydrophone array having fixed together an omnidirectional hydrophone and a pair of directional hydrophones having orthogonally arranged patterns of sensitivity fixed relative to an array heading, each said hydrophone providing a hydrophone output signal;

said submergible portion further including a combiner means connected to receive said directional hydrophone output signals for providing at least one combiner output signal which is displaced in phase from said omnidirectional hydrophone output signal by an amount indicative of the angular displacement of said array heading from the direction of the signal source;



said submergible sonobuoy portion further including multiplexer means for impressing said omnidirectional signal and said combiner output signal on respective quadrature components of a carrier to provide a multiplexer output signal carrying bearing information which is suitable for transmission along a single frequency channel; and

signal cable means connected between said multiplexer means and said surface sonobuoy portion for carrying said multiplexer output signal in one frequency channel to said sonobuoy surface portion.

4,017,823

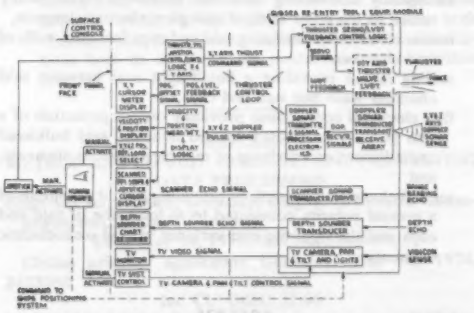
POSITION CONTROL SYSTEM FOR A SUBSEA VEHICLE

David A. Cooke, Saratoga, Calif., and David M. Edison, Murrysville, Pa., assignors to Subsea Equipment Associates Limited, Hamilton, Bermuda

Filed July 21, 1975, Ser. No. 597,577

Int. Cl.² G01S *9/66*

U.S. Cl. 340—3 D **5 Claims**



1. A position control system, for use in positioning relative to a subsea well a subsea vehicle or re-entry tool having thrusters, comprising, in combination:

a Doppler sonar system connected to said vehicle and operable for generating a Doppler pulse train signal having a pulse rate substantially proportional to the Doppler frequency produced by a change in the spatial position of said vehicle along a predetermined linear coordinate, whereby the occurrence of each pulse signal in said Doppler pulse train signal corresponds substantially to a predetermined linear distance;

velocity measurement means connected to said Doppler pulse train signal and operable for converting it into an equivalent velocity amplitude;

a pulse generator operable for producing a predetermined number of pulse signals equivalent to a certain linear distance along said coordinate;

up/down counter means operable for counting up from one input signal and down from another input signal;

connection means operable for connecting said up/down counter means to said Doppler pulse train signal and said pulse generator for opposite counting therein;

drive means connected to said up/down counter means and operable for supplying the count therein as an error signal for controlling one of said thrusters; and

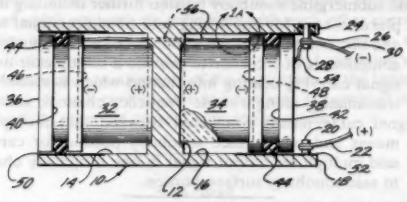
coupling means operable to couple said drive means to said one thruster.

4,017,824

ACCELERATION-INSENSITIVE HYDROPHONE

Merrill E. Fife, Canyon Country, and James W. Pell, Jr., Northridge, both of Calif., assignors to The Bendix Corporation, North Hollywood, Calif.

Filed June 6, 1975, Ser. No. 584,329
Int. Cl.² H04B *13/00*
U.S. Cl. 340—10 **10 Claims**



1. A hydrophone for providing electrical output signals in response to sensed acoustic signals comprising a hollow housing having substantial strength and a central bulkhead dividing said housing into two chambers,

a piezoelectric element of solid ceramic material abutting against and connected to each side of said bulkhead and spaced from the walls of said chambers,

electrically conducting end cap members mechanically sealed to the outer ends of said piezoelectric elements,

means electrically insulating said end caps from the walls of said chambers,

sealing means providing a liquid-tight seal between said chamber walls and said end caps,

first electrical connections providing output potentials of a first polarity connected to said housing, said bulkhead and adjacent end surfaces of said piezoelectric elements; and

second electrical connections providing output potentials of a second polarity connected to at least one of said end caps and the opposite end surfaces of said piezoelectric elements.

4,017,825

INTERSECTION EMERGENCY WARNING SYSTEM

Paul J. Pichey, 5317 Curry Ford Road, Orlando, Fla. 32806

Filed Sept. 8, 1975, Ser. No. 611,436
Int. Cl.² G08G *1/00*
U.S. Cl. 340—32 **13 Claims**

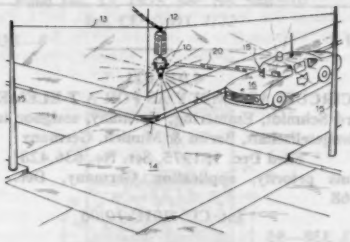
1. An intersection emergency warning system which is independent of other intersection traffic control devices, and remotely controlled from an emergency vehicle, comprising in combination:

radio frequency transmitting means for mounting on an emergency vehicle for transmitting activation signals;

radio frequency receiving means for receiving said activation signals;

visual warning means for generating a visual emergency warning signal, said visual warning means being coupled to said radio frequency receiving means and activated responsive to said activation signals from said radio frequency receiving means and independent of other intersection traffic control devices, with said visual warning means comprising an illuminated rotating beacon for emitting said visual emergency warning signal in an arc sweeping the intersection as said illuminated beacon is rotated;

audible warning means for generating an audible emergency



warning signal, said audible warning means being coupled to said radio frequency receiving means and activated responsive to said activation signals from said radio frequency receiving means;

a housing for carrying said radio frequency receiving means, said visual warning means and said audible warning means; and

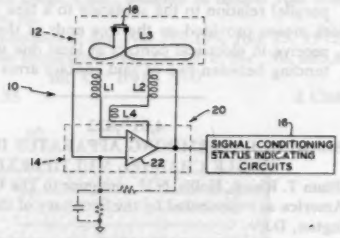
means for supporting said housing adjacent to said intersection at a position spaced from other intersection traffic control devices, whereby persons in proximity to said intersection may be warned by said visual and audible emergency warning signals as to the approach of said emergency vehicle independent of and not interacting with other intersection traffic control devices.

4,017,826

METHOD AND APPARATUS FOR EXTENDING THE OPERATING RANGE OF A CONDITION MONITORING SYSTEM

Robert S. Enabnit, Akron, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Sept. 24, 1975, Ser. No. 616,120
Int. Cl.² B60C *23/02*
U.S. Cl. 340—58 **12 Claims**



1. A monitoring system for sensing and indicating the occurrence of a change in condition of a first member moving relative to a second member comprising:

A. circuit means on the second member responsive to a modulation pulse signal at its input to provide an indication of the normal and/or abnormal condition of the first

member as determined by the presence or absence of a modulation signal;

B. a monitoring circuit on the second member comprising an amplifier having input and output inductances, the amplifier configured to operate at a threshold of two operational states, the first state being such that the operational parameters of the circuit influence regenerative feedback over degenerative feedback and the amplifier oscillates while the second state is such that the circuit parameters influence degenerative feedback over regenerative feedback and the amplifier does not oscillate, said monitoring circuit coupled to the above mentioned circuit means to provide a modulation signal that will influence the status of the circuit means for indicating the change in condition; and

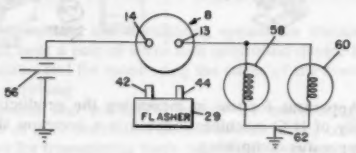
C. an inductive sensor circuit on the first member, movable therewith and responsive to the occurrence of a change in the condition being monitored, said sensor circuit configured to provide intercoupling of the amplifier input and output inductances when close-circuited and in proximate position thereto such that a signal is generated in the monitoring circuit regardless of its current oscillatory or nonoscillatory operational state.

4,017,827

LIGHT FLASHER SYSTEM FOR TRAVEL TRAILERS

Klaus J. Brodesser, 154 Sawyer Ave., West Babylon, N.Y. 11704

Filed Oct. 23, 1975, Ser. No. 625,108
Int. Cl.² B60Q *1/00, 1/46*
U.S. Cl. 340—81 R **2 Claims**



1. In a trailer having lights normally energized from the battery of a towing vehicle and also having a light flashing system to be energized from a battery in the trailer, the flashing system comprising:

a cable connected at a first end to the preselected trailer lights and a trailer battery, separately;

a trailer connector connected at the second end of the cable, the connector being removably attachable to a mating connector from a towing vehicle for deriving power from the vehicle battery fo the trailer lights when the vehicle is attached to the trailer; and

flasher means mounted to the trailer, the flasher means having contacts thereon for mating with the trailer connector when it is disconnected from the mating vehicle connector, thereby selectably connecting the trailer battery to the trailer lights through the flasher means, which is series connected with the lights, causing the trailer lights to flash independently of the vehicle battery, which enables the trailer lights to flash, even when the trailer is unhitched from the towing vehicle.

4,017,828

REDUNDANCY SYSTEM FOR DATA COMMUNICATION

Kazutaka Watanabe; Misao Shimizu; Toshio Ogawa; Akihiro Sugawara, and Kiyoharu Inou, all of Musashino, Japan, assignors to Yokogawa Electric Works, Ltd., Tokyo, Japan

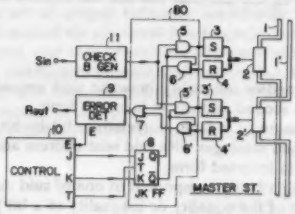
Filed July 10, 1975, Ser. No. 594,799
Claims priority, application Japan, July 19, 1974, 49-82903
Int. Cl.² G08C *25/00;* **G06F** *11/00*
U.S. Cl. 340—146.1 BE **5 Claims**

1. In a redundancy system for data communications between a master station and a slave station over two duplicate communication channels each capable of transmission and reception of signals to and from each of the master and slave stations, the slave station being arranged to transmit a responding signal to the master station upon receipt of each data transmission from the master station, the improvement which comprises:

switching means in the master station for selecting either one of said two communication channels to transmit data;

a first error detecting means in the master station for detecting an error in the signal transmitted by the slave station over the selected channel including an error corresponding to the absence of a responding transmission to the master station;

control means in the master station for said switching means, said control means causing said switching means to change channels following each data transmission when both channels are in normal operation, and, in response to an error detected by the error detection



means, causing one of said two channels to be selected exclusively to transmit data when the other channel fails; and

a second error detecting means in the slave station for detecting errors in transmitted signals from the master station over the selected communication channel and for generating a signal for inhibiting utilization by the slave station of said erroneously transmitted signals and for preventing a responding transmission by the slave station to the master station, whereby the first error detector means in the master station detects the presence of a transmission error noted by a slave station and causes the switching means to select one of the two channels exclusively to transmit data;

whereby the two channels are regularly tested during alternating data transmissions for errors, and a single error detection means in the master station can serve both channels and detect transmission errors in communications both to and from the master station over either channel.

4,017,829

METHOD AND CIRCUIT ARRANGEMENT FOR TESTING DATA PROCESSORS

Hugo Sternat, Munich, Germany, assignor to Siemens Aktiengesellschaft, Munich, Germany

Filed May 14, 1975, Ser. No. 577,447
Claims priority, application Germany, May 14, 1974, 2423260
Int. Cl.² G08C *25/00*
U.S. Cl. 340—146.1 C **8 Claims**

1. A method for testing data processing systems having a plurality of peripheral units connected to a central control by means of a bus line and wherein check instructions are sent over the bus line so as to obtain predetermined answerbacks to check these answerbacks, comprising the steps of:

sending from said central control a first check instruction and an address of a given peripheral unit for checking the correctness of address decoding in said peripheral units,

communicating, responsive to said first check instruction, the address of the addressed peripheral unit to said central control as a first message,

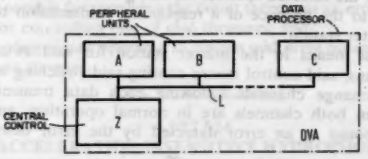
comparing said first message received in said central control with said sent address,

sending, thereafter, a second check instruction and said sent address from said central control,

communicating, responsive to said second check instruction, said sent address of the addressed peripheral unit in inverted form to said central control as a second message,

comparing said second message received in said central control with said sent address in inverted form,

indicating a fault if said comparing steps produce the result of inequality between said first message and said sent



address and/or inequality between said second message and said second address in inverted form,

upon indicaion of a fault, correlating, bit-by-bit, said first and second messages with said sent address and said sent address in inverted form,

determining a faulty component in one of said messages on the basis of the equality or inequality of a bit position in said correlated messages and addresses and

comparing said faulty component with addresses of others of said peripheral units for determining the address where erroneous address decoding is occurring thereby causing faulty messages.

4,017,830

SHEET COMPARING SYSTEM AND COMPARATOR ADAPTED FOR SAID SYSTEM

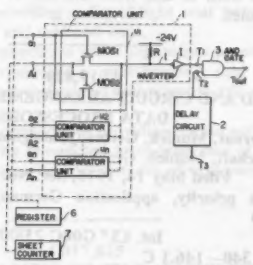
Hideto Shigemori, and Motoaki Fukunaga, both of Himeji, Japan, assignors to Glory Kogyo Kabushiki Kaisha, Japan

Continuation of Ser. No. 287,570, Sept. 8, 1972, abandoned. This application Feb. 13, 1975, Ser. No. 549,736

Claims priority, application Japan, Sept. 9, 1971, 46-69956; Sept. 9, 1971, 46-69957

Int. Cl.² B07B *13/04*

U.S. Cl. 340—146.2 **2 Claims**



1. A sheet counter comparison system for automatically comparing a counted number of sheets with a predetermined number of sheets to be counted, which system comprises:

register means for storing information representative of said predetermined number of sheets to be counted;

counter means for counting a sequence of counting pulse signals representative of the sheets being counted by the counter, said counter means being driven step-by-step at the leading edge of each of said counting pulse signals;

comparator means connected to receive the outputs of said register means and said counter means for producing at the output thereof a comparison coincidence signal when the number represented by the output from said counter means equals said predetermined number of sheets to be counted; and

gate control circuit means for producing an output coincidence signal in response to said comparison coincidence signal and to the trailing edge of said counting pulse signals, whereby said output coincidence signal is produced a predetermined time after the counting operation of said counter means.

4,017,831

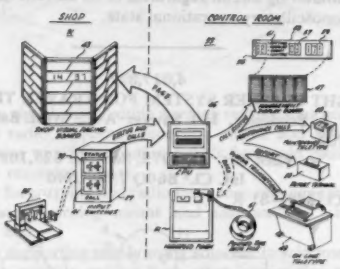
N/C MACHINE PAGING, STATUS AND REPORT SYSTEM

Jansey D. Tieden, Puyallup, and Forester E. Woodruff, Jr., Renton, both of Wash., assignors to The Boeing Company, Seattle, Wash.

Filed Mar. 15, 1976, Ser. No. 666,641

Int. Cl.² H04Q *9/00*

U.S. Cl. 340—147 P **18 Claims**



1. Apparatus for use in increasing the productivity of a plurality of N/C machines located in a common shop area, said apparatus comprising:

A. a plurality of operator modules, one associated with each of said N/C machines, each of said operator modules:

1. being individually addressable by a predetermined digital interrogation code; and,

2. including manually adjustable encoding means for producing:

a. a digital call code related to the support assistance needs of the operator of the machine; and,

b. a digital status code related to the status of the machine;

B. a CPU, connected to said plurality of operator modules, for:

1. producing predetermined digital interrogation codes suitable for addressing said plurality of operator modules;

2. interrogating said plurality of operator modules by sequentially applying said digital interrogation codes to said plurality of operator modules;

3. receiving the digital call and status codes produced by each of said N/C machines;

4. producing digital paging codes related to said digital call codes, said digital paging codes being suitable for controlling at least one visual paging board such that said visual paging board displays alphanumeric characters related to said digital call codes; and,

5. producing digital status board codes related to said digital status codes, said digital status board codes suitable for controlling a status board display adapted to display alphanumeric characters related to said digital status codes;

C. at least one visual paging board connected to said CPU and suitable for location in said common shop area for receiving said digital paging codes and creating alphanumeric character displays in accordance therewith; and,

D. a status board connected to said CPU for receiving said digital status board codes and creating a plurality of alphanumeric character displays in accordance therewith, one display of each of said plurality of alphanumeric character displays being related to a particular N/C machine of said plurality of N/C machines. appropriate messages

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4,017,832

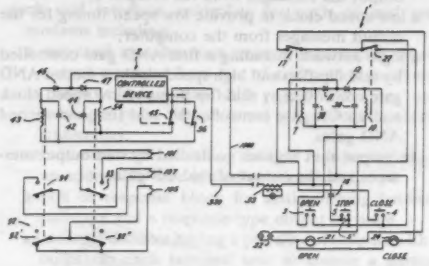
TWO WIRE COMMAND AND MONITORING SYSTEM

Donald Edmond Gilbert, Houston, Tex., assignor to Powell Electrical Manufacturing Company, Houston, Tex.

Continuation-in-part of Ser. No. 596,386, July 16, 1975, Pat. No. 3,993,977. This application May 27, 1976, Ser. No. 690,411

Int. Cl.² H04Q *9/06;* **H01H** *47/00*

U.S. Cl. 340—147 LP **3 Claims**



1. A transmitting and monitoring system for transmitting commands over a pair of wires to a controlled device having two end states and for monitoring the states of the controlled device, comprising:

transmission and indication means for monitoring such states of such controlled device and including command means for transmitting three commands over such pair of wires including a command to stop such controlled device, said command means including actuation means for actuating said command means to transmit said commands;

control implementation means for receiving such commands from such pair of wires and transmitting such commands to such controlled device; and

said transmission means including inhibiting means for preventing such stop command from being transmitted when such controlled device is in one of such two end states, said inhibiting means including a first portion connected in series with said actuation means for said stop command and a second portion connected in parallel with said actuation means.

4,017,833

SUMMER FOR GROUP RECORDER

Robert A. Broding, Tulsa, Okla., assignor to Standard Oil Company (Indiana), Chicago, Ill.

Filed Dec. 29, 1975, Ser. No. 644,795

Int. Cl.² G01V *1/22*

U.S. Cl. 340—15.5 TS **4 Claims**

1. In a portable recorder containing means to receive and amplify an electric signal, means to sample the amplified signal periodically at a base frequency f_1, and means for recording reproducibly on a medium a quantity directly proportional to the sampled amplitude of said amplified signal, the improvement comprising

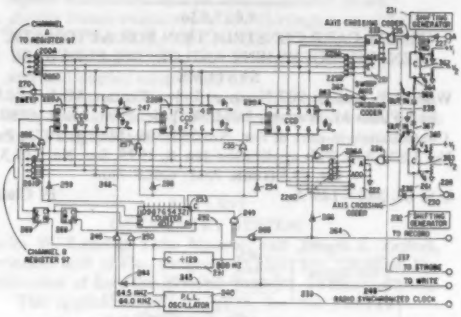
1. a plurality of charge-coupled shift registers connected in cascade, each such register being capable of storing in an identical plurality of channels of N successive adjoining memory cells charges equivalent to a logical one or a logical zero, and of replenishing automatically such charge values as said values move through said cells, said registers further being capable of moving said charge values through said plurality of memory cells on application of a multiphase electric voltage of a frequency lying within a predetermined range, said registers further being capable of discharging said charge value in the last of said memory cells into said means for recording reproducibly, the write terminals of each of said shift registers being connected to the read terminals of the next preceding of said shift registers,

2. a bank of AND gates for synchronously inserting new data to a plurality of conductors as well as to a second bank of AND gates for synchronously transferring output data from said plurality of conductor lines to said means for recording,

3. said plurality of conductors, insulated from each other, forming bi-directional data transfer lines, each of said plurality of conductors connecting in parallel only data lines of said charged coupled shift registers, an adder, and said AND gates used with each conductor,

4. said adder circuit containing two sets of input terminals and a set of output terminals electrically equal to the digital sum of the electrical input signals on both said sets of inputs, one only of said sets of inputs being connected to the conductors forming said transfer bus, and the other of said sets being connected to the output of said sampling means of said portable recorder,

5. stable oscillator means for producing an actuating signal



at a predetermined base frequency f_1, connected to and actuating said sampling means,

6. a synchronized second oscillator connected to said stable oscillator means for generating two output signals, one at a base frequency f_2 where f_2 is f_1 times N, and the other at a base frequency f_3 where f_3 is f_1 times (N+1),

7. means alternatively connected to said two output signals of frequency f_2 and f_3 for producing a multiphase signal connected in parallel to the appropriate terminals of all said shift registers for moving charge values through said memory cells thereof,

8. a frequency divider synchronized by connection on the input to the signal of frequency f_3 for producing an output of base frequency f_1 by division by (N+1),

9. a program counter containing a number of separate, equally serially spaced outputs corresponding in number to the number of said shift registers, each of said outputs in turn being connected to send an operative pulse to the write terminal of the corresponding one of said shift registers in accordance with its position in the cascade connection, the reset input of said counter being connected to the output of said frequency divider,

10. a plurality of OR gates equal in number to the number of said shift registers, each containing two inputs and one output, one each of said inputs being connected in turn to one of the separate outputs of said program counter, the second of each of said inputs being connected to the next succeeding of the separate outputs of said program counter, and said output being connected to the data

terminal of the corresponding one of said shift registers, and

11. an actuating circuit including separate means for producing a write and a record actuating electric signal, said means being connected to the two inputs of an OR gate, the output of which forms one input to a 3-input AND gate, the other two inputs being connected respectively to the output of said frequency divider and to the frequency f_3 output of said second oscillator, the output of said AND gate being connected to the clock terminal of said counter, said means of producing said write actuating signal being connected to one input of another OR gate, the other input to which is connected to the actuator of frequency f_1 of said sampling means, the output of said another OR gate being connected to alternative switching means interposed between the f_2 and f_3 outputs of said second oscillator and said means (6) for producing a multiphase signal whereby said last-mentioned means operates either at base frequency f_2 or f_3.

whereby said shift registers precess at frequency f_2 until a write pulse is generated which causes said shift registers to sum any stored input synchronously with input from said adder circuit at frequency f_3, and whereby, on generation of a record pulse, the contents of said cascaded shift registers are serially dumped into said means for reproducibly recording to form a reproducible record of said sums.

4,017,834

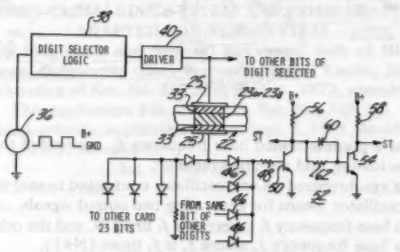
CREDIT CARD CONSTRUCTION FOR AUTOMATIC VENDING EQUIPMENT AND CREDIT PURCHASE SYSTEMS

William E. Cuttill, 907 Newport Drive, Fenton, Mich. 48430, and Vilma M. Wagner, 1081 W. Yale, Flint, Mich. 48503

Continuation-in-part of Ser. No. 357,509, May 4, 1973, Pat. No. 3,872,438. This application Jan. 8, 1975, Ser. No. 539,330

Int. Cl.[2] G06K 7/08; G06F 7/00

U.S. Cl. 340—149 A 15 Claims



1. A card of the self-identifying type, comprising:

a core of vinyl material having a plurality of openings formed therein in a predetermined pattern;

an upper and a lower polyester layer positionable above and below said core;

an upper and a lower metallic contact positionable in each of said openings and extending through opposed openings preformed in each respective upper and lower layer; and

a plurality of high and low dielectric constant inserts positionable between preselected pairs of said contacts in accordance with the code selected.

4,017,835

SYSTEM FOR VERIFYING CREDIT STATUS

Richard D. Randolph, 3212 Colfax, Pueblo, Colo. 81008

Filed Feb. 11, 1974, Ser. No. 441,649

Int. Cl.[2] G06F 3/14; H04M 11/06; H04Q 9/00

U.S. Cl. 340—152 R 3 Claims

1. In a credit status verification system, the combination comprising:

an on-line real-time computer programmed with data concerning the credit of a bearer of a customer account decimal number including the number of short checks in a particular time period generating high-speed, synchronous output messages in a binary coded digital signal form, said computer generating response-type output messages relating to the credit status of a bearer, line control characters and address characters and poll-type output messages;

converter means for the computer having

a step-down portion to change the output messages from the computer to a slow-speed smaller bit code, asynchronous format, said step down portion including:

a decode logic circuit to receive the output messages from the computer,

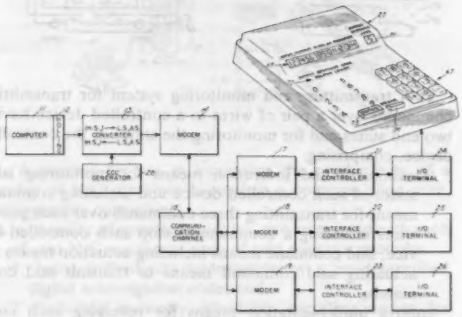
a flip-flop to receive a set signal from the decode logic circuit and receive a reset signal from the decode logic circuit actuated by an end-of-message character in the output message,

a high speed clock to provide high speed timing to output the messages from the computer,

a low speed clock to provide low speed timing for the output messages from the computer,

a logic network including a first AND gate controlled by said flip-flop and high speed clock, a second AND gate controlled by said flip-flop and low speed clock and an OR gate controlled by said first and second AND gates,

an output shift register controlled by said output messages and the output of said OR gate,



a character strip control to control the output shift register to remove selected characters from the output message and from the output shift register,

and a universal asynchronous receiver-transmitter coupled to the output of said output shift register to convert the output messages from the output shift register to a form that may be transmitted by a modem;

a step-up portion to change the input messages from the terminals to a high-speed larger bit code asynchronous format, said step-up portion including:

a universal asynchronous receiver-transmitter to convert the input messages received from a modem to a form that may be applied to logic circuits,

a decode logic circuit to receive the input messages from the universal asynchronous receiver-transmitter,

a flip-flop to receive a set signal from the decode logic circuit and a reset signal from the decode logic circuit actuated by an end-of-message character in the input message,

a high speed clock to provide high speed timing for input messages,

a low speed clock to provide low speed timing for input messages,

a logic network including a first AND gate controlled by the flip-flop and high speed clock, a second AND gate controlled by the flip-flop and low speed clock

and an OR gate controlled by said first and second AND gates,

an input shift register controlled by the output messages from the universal asynchronous receiver-transmitter and the OR gate,

a character add control to control the output of the input shift register to add line control characters for the high speed input messages and

a character generator coupled to an input shift register to add a character that checks for error;

a telephone line to transmit output messages and transmit input messages;

a first modem coupled between the telephone line and the converter means and a second modem coupled between the telephone line and each of a plurality of interface controllers, each said modem converting digital signals to analog signals and converting analog signals back to digital signals;

each said interface controller for each of said second modems including:

a universal asynchronous receiver-transmitter receiving output messages from one of said second modems,

an address recognition shift register receiving output messages from the universal asynchronous receiver-transmitter,

an address strap controlling the shift register to recognize an address for one of said terminal units,

a poll or response block for distinguishing between a poll-type and a response-type output message,

an address decoder having a plurality of outputs with one output to each terminal unit to couple a particular response-type message to a particular of said terminal units,

an any inputs ready block responsive to a poll-type output message,

a go-ahead generator responsive to a no signal from the any inputs ready block for generating a go-ahead character indicating no response-type messages were sent,

an input control receiving data-type input messages from each terminal unit controlled by a yes signal from the any inputs ready block allowing only one input message per poll,

an input inquiry assembly register responsive to the output of said input control,

an OR gate responsive to the go-ahead generator and the output of the input inquiry assembly register and

a universal asynchronous receiver-transmitter responsive to an output from the OR gate and a control for controlling the input inquiry assembly shift register and universal asynchronous receiver-transmitter;

a plurality of input-output terminal units associated with each interface controller for each of said second modems for generating input messages in a binary coded signal form, said input messages including line control character, address character, polling character and data-type messages, each said terminal unit including:

a keyboard with a plurality of depressible keys to enter a selected decimal number,

a display register to display the decimal number produced by depressing the keys,

an output response register to display a response-type output message received from the computer, and

a calculator large scale integrated circuit responsive to a selected decimal number input on said keyboard transmitting said entered decimal number to said display register for storing said entered decimal number in a binary coded form until a certain response-type message is received from said computer, at which time said stored decimal number is automatically transmitted as an input message in a binary coded digital form to said computer.

4,017,836

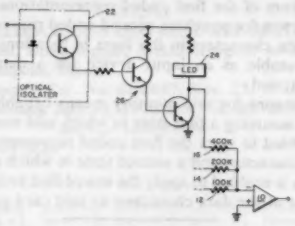
EVENT STACKER AND DISPLAY DEVICE

Wesley R. Paulson, Ventura, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Apr. 5, 1976, Ser. No. 673,494

Int. Cl.² G08B *29/00*; H03K *13/04*

U.S. Cl. 340—172 **7 Claims**



1. An event stacker and display device for encoding a multiplicity of event signals into a single output source comprising:

a. optical isolator means for transmitting event signals produced by test equipment;

b. Darlington amplification means for amplifying said event signals transmitted by said optical isolator means;

c. display means connected to said Darlington amplification means for indicating the presence of said event signals;

d. resistive means connected between a summing junction and said display means; and

e. operational amplification means connected to said summing junction for amplitude encoding said event signals into a single output source.

4,017,837

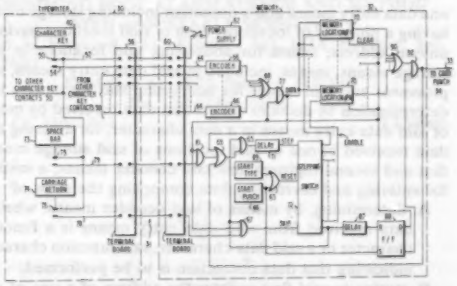
DATA ENTRY SYSTEM

Charles W. Lansing, Lake Monroe, and Joseph S. Zajicek, Orlando, both of Fla., assignors to TDX, Inc., Orlando, Fla.

Continuation of Ser. No. 392,663, Aug. 29, 1973, abandoned. This application July 25, 1975, Ser. No. 599,119

Int. Cl.² G06F *3/08*, *3/10*

U.S. Cl. 340—172.5 **2 Claims**



1. A system for recording data characters on a form in a written representation, permitting use of the form as a business document, and in a punched code representation, permitting use of the form as a data processing system input device, said system comprising:

first means for generating written representations of data characters on the form in any locations desired for making the form usable as a business document, said means comprising a typewriter having a plurality of character keys, each character key corresponding uniquely with a data character, each character having sensing means for sensing actuation of the character key;

second means for generating first coded representations of

the data characters which are defined by the generation of said written representations of data characters by said first means, said means comprising encoding means responsive to the sensing means for generating the first coded representation of the data character associated with an actuated character key;

memory means coupled to the second means for storing the first coded representations of the data characters;

card punch means coupled to the memory means for receipt therefrom of the first coded representations of the data characters for punching second coded representations of the data characters in the form in locations making the form usable as an input device for a data processing system; and

control means for said memory means capable of alternatively assuming a first state in which said memory means is enabled to store the first coded representations of the data characters and a second state in which said memory means is enabled to apply the stored first coded representations of the data characters to said card punch means.

4,017,838

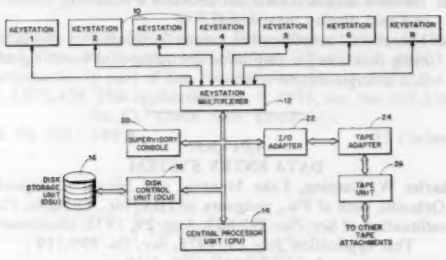
DATA ENTRY AND RECORDING SYSTEM HAVING FIELD CORRECT CAPABILITY

Janice K. Breyer, Herndon, Va., assignor to Honeywell Information Systems, Inc., Waltham, Mass.

Continuation of Ser. No. 348,783, April 6, 1973, abandoned. This application Sept. 19, 1974, Ser. No. 507,507

Int. Cl.² G06F 7/22

U.S. Cl. 340—172.5 **2 Claims**



1. In a data entry and correction system comprising at least one data entry means and a processor including storage means having a plurality of locations, each of said locations having a unique address, means for addressing said locations in said storage means, means, included in said data entry means, said processor and said means for addressing and responsive to a determination by decoder means that data received by means of said data entry means in a data character, for entering said data received in one of said locations of said storage means, first and second registers and said decoder means, a method for entering and correcting data comprising the steps of:

A. determining, by means of said decoder means, whether data received from said data entry means is a function character or a said data character, said function character indicating that data correction is to be performed;

B. storing in said first register the address of a one of said locations in said storage means in which a data character was last entered, said last-mentioned location hereinafter referred to as said latest location, and wherein said method further comprises the following method steps upon determining that said data received is a function character;

C. addressing, by means of said means for addressing, a one of said locations in said storage means in which a said data character has been previously incorrectly entered and which is to be corrected, said last-mentioned location hereinafter referred to as the update location;

D. storing the address of said update location in said second register;

E. entering, by means of said data entry means and by means of said means for addressing in response to the address stored in said second register, the correct data character in said update location;

F. reentering, by means of said data entry means, previously entered data characters in a predetermined number of locations following said update location;

G. automatically addressing, by means of said means for addressing and in response to the address stored in said second register, said update location immediately after reentering data in the last location of said predetermined number of locations;

H. detecting that said update location has been addressed during said step of automatically addressing; and

I. addressing, in response to the detection that said update location has been automatically addressed, said latest location whose address is contained in said first register, whereby an operator may proceed to enter a data character beginning with a one of said locations succeeding said latest location after said data correction has been performed.

4,017,839

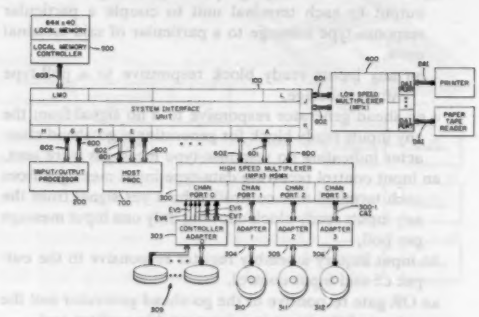
INPUT/OUTPUT MULTIPLEXER SECURITY SYSTEM

Jaime Calle, Glendale, and V. Michael Griswold, Phoenix, both of Ariz., assignors to Honeywell Information Systems, Inc., Waltham, Mass.

Filed June 30, 1975, Ser. No. 591,563

Int. Cl.² G06F 9/18, 3/00

U.S. Cl. 340—172.5 **25 Claims**



22. In a data processing system having addressable memory module means for storing program instructions, processor module means for generating commands in response to said program instructions, said processor module means including control means for processing detected conditions using a number of control routines stored in said memory module, at least one input/output multiplexer module means having a plurality of ports coupled to a plurality of peripheral devices for processing event signals occurring during input/output operations executed in response to user program instructions and said memory module means and system interface means interconnected between each of said module means for establishing paths of communication between pairs of said module means, said multiplexer module means comprising:

a plurality of channel sections, each section being coupled to a different one of said ports, each of said channel sections including a number of registers arranged for storing data and control information transferred by said commands, generated in response to instructions for controlling the operation of said channel sections, required for execution of said input/output operations by said multiplexer module means;

first and second registers, said first register connected to receive each of said commands and said second register connected to receive the data to be transferred in accordance with said commands; and,

control means for controlling the operation of said multiplexer module means, said control means being coupled to each of said registers, said control means including:

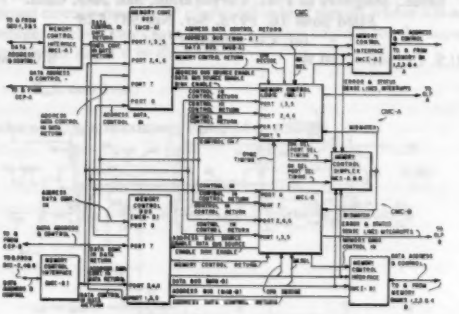
logic gating means for generating output signals, said logic gating means being coupled to different ones of said number of registers; and,

input means coupled to said first register and to said logic gating means, said input means being operative in response to each command coded to specify the loading of one of said number of registers designated as restricted to condition said logic gating means to generate an output signal for enabling the loading of said one register of said number of registers only when each said command is coded to indicate that said loading is permitted by said system and to inhibit said logic gating means from generating said output signal when each said command is coded to indicate that said loading is required to be effected by one of said control routines in lieu of said instructions controlling one of said channel sections to ensure the security of the system.

4,017,840
METHOD AND APPARATUS FOR PROTECTING MEMORY STORAGE LOCATION ACCESSES

Kasimir W. Schild, Needham Heights, Mass.; Richard D. Fleming, Geneva, Ohio, and Phil R. Harrington, Mount Prospect, Ill., assignors to GTE Automatic Electric Laboratories Incorporated, Northlake, Ill.

Filed June 15, 1973, Ser. No. 370,559
Int. Cl.² G06F *13/00*
U.S. Cl. 340—172.5 **11 Claims**

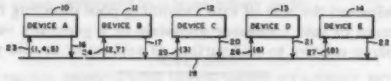


1. In a communication switching system, including switching network means, data processing means for controlling apparatus to effect connections over said switching network means, said data processing means including a memory control arrangement including a central processor means, a computer main memory means having a plurality of addressable locations for storing data and instructions for said central processor means, a plurality of auxiliary memory means for storing additional data and instructions for said central processor means, and memory control means for providing access to said computer main memory means for said auxiliary memory means and said central processor means, different predetermined blocks of said data storage locations in said main memory means being assigned to different ones of said auxiliary memory means as an initialization table for the auxiliary memory means for storing data transferred to said main memory means from the corresponding auxiliary memory means to enable access thereof by the central processor means, said memory control means including first means responsive to a memory access request provided by one of said auxiliary memory means, said request including an address of said main memory means and a control input indicating a read or write operation, to determine if the address provided by a given auxiliary memory means corresponds to one of the data storage locations of the initialization table of a different one of said auxiliary memory means, and second means responsive to said first means for aborting a write operation whenever a given auxiliary memory means addresses a data storage location in the initialization table assigned to a different one of said auxiliary memory means as determined by said second means.

4,017,841
BUS ALLOCATION CONTROL APPARATUS

Earl D. Jensen, Bloomington, Minn., assignor to Honeywell Inc., Minneapolis, Minn.

Continuation of Ser. No. 418,407, Nov. 23, 1973. This application July 21, 1975, Ser. No. 597,858
Int. Cl.² G06F *9/18*
U.S. Cl. 340—172.5 **4 Claims**



1. In a digital processing system:

a data bus;

a plurality of devices containing data to be communicated on said data bus, the data communicated by each device including at least an END OF DATA signal;

self-recycling counter means in each device adapted for incrementation through a repeating cycle of counts in response to successive END OF DATA signals;

means in each device connecting said counter means to said bus so that the counter means in all of said devices are synchronously incremented by each END OF DATA signal;

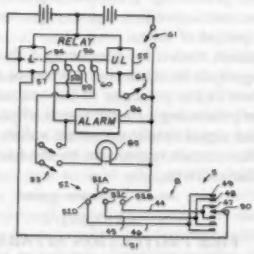
output means in each device selectively operable to permit transmission of data in said device to said data bus; and

further means in each device for causing operation of said output means only when the count of END OF DATA signals has one or more predetermined values in the cycle of counts.

4,017,842
SWIMMING POOL ALARM SYSTEM AND METHOD WITH ADJUSTABLE SENSITIVITY

Mark K. Vineyard, 1617 Fannin - Apt. 1114, Houston, Tex. 77002

Filed Oct. 21, 1974, Ser. No. 516,143
Int. Cl.² G08B *21/00*
U.S. Cl. 340—261 **7 Claims**



1. A security system for a swimming pool and the like, including

a detector section having a plurality of stationary electrodes spaced different predetermined distances from a reference point functionally related to the normal water level in said pool and further having a contactor electrode

movable toward said stationary electrodes through distances functionally related to the heights of disturbances of the surface of the water in said pool,

an electrical cable extending from said detector section to an observation site and having a plurality of conductors each connected to a different one of said electrodes in said detector section,

an alarm section located at said observation site and having a selector switch interconnected with said conductor coupled to said movable electrode and connectable to a selected one of said conductors coupled with said stationary electrodes,

said detector section further comprising an arcuately movable lever arm having said contactor electrode fixed to one end for positioning at a reference location relative to said stationary electrodes,

a bouyant member fixed to the other end of said lever arm for disposition in said water, and

attachment means for pivotally supporting said lever arm adjacent the side of said swimming pool directing movement of said contactor arcuately in a generally vertical plane relative to said surface of said water in said pool.

4,017,843

VEHICLE DRIVER ALERTNESS APPARATUS MONITORING STEERING WHEEL OSCILLATIONS

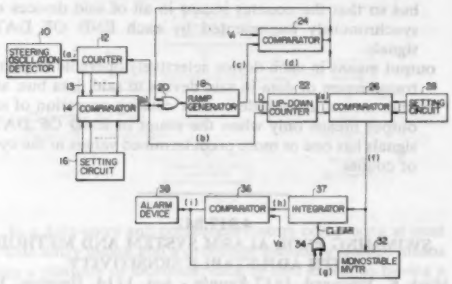
Takayuki Yanagishima, Yokohama, Japan, assignor to Nissan Motor Co., Ltd., Yokohama, Japan

Filed Feb. 5, 1976, Ser. No. 655,580

Claims priority, application Japan, Feb. 7, 1975, 50-16476

Int. Cl.² G08B *21/00;* **B60Q** *5/00*

U.S. Cl. 340—279 **7 Claims**



1. A vehicle safety apparatus comprising:

means for detecting movements associated with the driving activity of a vehicle driver to produce a first signal in response to a predetermined number of said movements;

means for producing a second signal when the interval between successive first signals is greater than a predetermined period of time;

an integration circuit for producing a third signal of which the magnitude increases in response to the first signal and decreases in the presence of the second signal;

means for producing a fourth signal when the magnitude of the third signal reaches a preset value; and

a utilization circuit responsive to the fourth signal to alert the vehicle driver.

4,017,844

FIRE PROTECTION APPARATUS

Enio Facchini, Framingham, and Carl I. Swanson, Boylston, both of Mass., assignors to Walter Kidde & Company, Inc., Clifton, N.J.

Filed July 14, 1975, Ser. No. 595,626

Int. Cl.² G08B *25/00*

U.S. Cl. 340—289 **7 Claims**

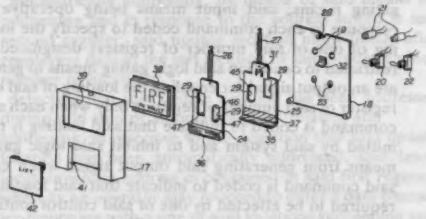
1. Fire control apparatus comprising:

a box for mounting on a support surface;

a first electrical switch mounted in said box and manually operable from an open to a closed position;

latch means for latching said first switch in said closed position;

a second electrical switch mounted in said box and manually operable from an open to a closed position;



restoring means for returning said second switch to said open position after being manually actuated into said closed position; and

mechanical indicator means for providing a visual indication in response to movement of said first switch into said closed position.

4,017,845

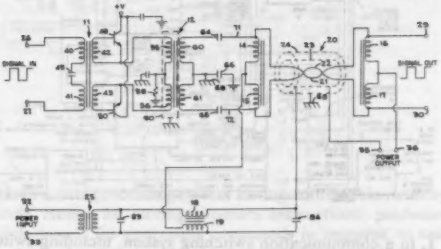
CIRCUITRY FOR SIMULTANEOUS TRANSMISSION OF SIGNALS AND POWER

Thomas M. Kilian, Blaine, and Mark D. Ryan, Fridley, both of Minn., assignors to FMC Corporation, San Jose, Calif.

Filed June 16, 1975, Ser. No. 587,525

Int. Cl.² H04M *11/04*

U.S. Cl. 340—310 R **8 Claims**

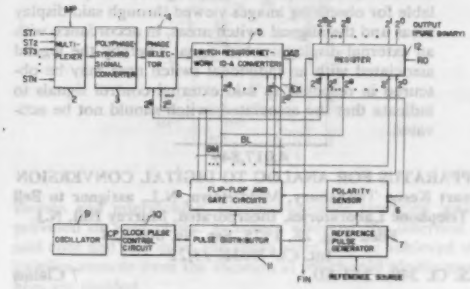


4. Circuitry for simultaneous transmission of high frequency signals and low frequency power between distant points, for use with a source of high frequency signals having a pair of output leads and a low frequency power supply, said circuitry comprising: a transmission line having a twisted pair of wires and a shield enclosing said wires; means for connecting said power supply between said shield and each of said wires at a first end of said transmission line; means for connecting one of said output leads from said source of high frequency signals to a first one of said wires; means for connecting the other of said output leads to a second one of said wires at said first end of said transmission line, said means for connecting said source of high frequency signals to said first wire and to said second wire each including means for preventing said low frequency power from being coupled to said source of high frequency signals; a pair of power output terminals, one of said power output terminals being connected to said shield at a second end of said transmission line; and means for coupling the other of said power output terminals to each of said wires at said second end of said transmission line so that said high frequency signals are available between said first and said second wires at said second end of said transmission line.

4,017,846
SYNCHRO-TO-DIGITAL CONVERTER

Shigeru Aramaki, Tokyo, Japan, assignor to Tamagawa Seiki Kabushiki Kaisha, Japan

Continuation of Ser. No. 347,339, April 2, 1973, abandoned.
This application Apr. 17, 1975, Ser. No. 568,982
Int. Cl.² G08C 9/00
U.S. Cl. 340—347 SY 1 Claim



1. A synchro-to-digital signal converter comprising, in combination, a polyphase-synchro signal converter connected to a synchro system to receive synchro signals therefrom, and including operational circuits each comprising an operational amplifier, first and second resistors connected in the input side of said operational amplifier, and a third resistor provided in a feedback circuit of said operational amplifier, whereby, upon reception of an output signal from a synchro rotor corresponding to an input rotational angle θ thereof, said operational circuits provide 2^n electrical output signals where n is an integer greater than zero, having a phase angle α for the input rotational angle θ in the form of

$$E_m K \sin(\theta+\alpha)$$

where E_m is a maximum value of a voltage

$$K=\sqrt{\left(a-\frac{b}{2}\right)^2+\left(\frac{\sqrt{3}}{2}b\right)^2}\quad,\ a=\frac{r_3}{r_1}\text{ and }b=\frac{r_3}{r_2}$$

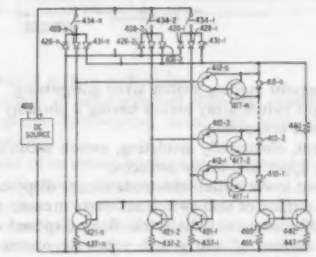
$$\alpha=\tan^{-1}\frac{\frac{\sqrt{3}}{2}b}{a-\frac{b}{2}},$$

thereby to obtain output signals corresponding to an 2^n phase synchro; a phase selector connected to the output of said synchro signal converter and operable to supply two selected adjacent output phase signals; a single D-A converter connected to the output of said phase selector and receiving said two selected phase signals therefrom, and driven by pure binary coded signals; and an operational device, connected to said D-A converter, having a reference pulse generator for generating timing pulses synchronized with a half period of a carrier for the synchro system and operable to initiate operation of said operational device and also to generate a train of polarity discriminating pulses, a polarity sensor connected to said reference pulse generator and to said D-A converter for discriminating polarity of an output signal from said D-A converter, an oscillator generating clock pulses, a pulse distributor connected to said oscillator, flip-flop and gate circuits connected to said pulse distributor, and a clock pulse control circuit connected between said oscillator and said pulse distributor for controlling the introduction of said clock pulses to said pulse distributor and said flip-flop and gate circuits, whereby the operation of said operational device is initiated upon generation of said timing pulses, with all of the flip-flops outputs from said flip-flop and gate circuits being set to "0" upon reception of a first allocating pulse from said pulse generator, and the subsequent delivery of a second allocating pulse ad succeeding allocating pulses from said pulse distributor temporarily setting the flip-flop outputs, from the higher bit to the lower bit, to "1" through the flip-flop and gate circuits, the "1" state of the flip-flop outputs being maintained or converted to "0" depending on a polarity signal simultaneously delivered to said flip-flop and gate circuits from the said polarity sensor, thereby to carry out operation up to the least significant bit, and, when the operation up to the least significant bit is completed, delivering an operation completion signal; said operational device being connected to said phase selector to supply the higher bit signals thereto to select said two adjacent phase signals from said polyphase-synchro signal converter for supply to said single D-A converter; said operational device being connected to said D-A converter to supply the lower bit signals thereto for driving said D-A converter to convert the rotational angle of a synchro input shaft into a value expressed in a pure binary code.

4,017,847
LUMINOUS INDICATOR WITH ZERO STANDBY POWER

Thomas Maynard Burford, Summit, and George Raymond Westerman, Denville, both of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Nov. 14, 1975, Ser. No. 631,921
Int. Cl.² G09F 9/32
U.S. Cl. 340—336 4 Claims



1. An indicator circuit comprising a plurality of LED elements each having an anode and a cathode, said LEDs being connected in like polarity series relation to form a series circuit having an anode end and a cathode end; a voltage source having first and second terminals; a switching device for each LED comprising a path connected in parallel with said LED and a control electrode; first means connected to said control electrode for applying a first signal to said control electrode for rendering said path conductive and for applying a second signal to said control electrode for rendering said path nonconductive; each first means comprising a switch having first and second terminals, a first diode having an anode and a cathode, a first transistor having a collector, an emitter and a base, and a first impedance; said voltage source first terminal being connected to said switch first terminal; said switch second terminal being connected to said first diode anode; said first diode cathode being connected to said first transistor collector and to said control electrode; said first transistor emitter being connected to said voltage source second terminal through said first impedance; means for applying a predetermined current to said series circuit only when at least one of said switches is closed comprising a plurality of second diodes each having an anode and a cathode, a second transistor and a third transistor each having a collector, an emitter and a base, and second, third and fourth impedances; one second diode anode being connected to the second terminal of one of said switches; the cathode of each second diode being connected to the anode end of said series LED circuit and to said second transistor collector through said second

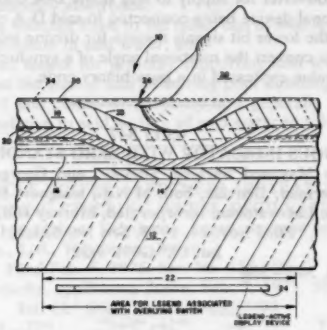
impedance; said second transistor collector being connected to said second transistor base, the base of each first transistor, and the base of said third transistor; said second transistor emitter being connected through said third impedance to the voltage source second terminal; said third transistor collector being connected to the cathode end of said series LED circuit; and said third transistor emitter being connected to said voltage source second terminal through said fourth impedance.

4,017,848

TRANSPARENT KEYBOARD SWITCH AND ARRAY

Lawrence E. Tannas, Jr., Orange, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.

Filed May 19, 1975, Ser. No. 579,114
Int. Cl.² G08C *1/00*
U.S. Cl. 340—365 R **8 Claims**



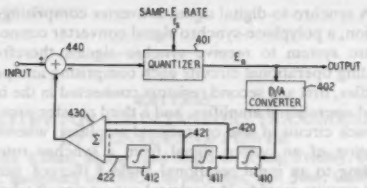
1. An operator guiding switch array comprising:
transparent switch array means having a plurality of switch areas and comprising:
transparent, electrically insulating, switch substrate means having upper and lower surfaces;
transparent lower switch electrode means disposed on said upper surface of said switch substrate means;
a layer of transparent dielectric fluid disposed over said upper surface of said switch substrate means and said lower switch electrode means;
transparent flexible film means disposed over said said dielectric fluid;
transparent upper switch electrode means disposed on said film means, interposed between said film means and said dielectric fluid at least in selected locations and overlapping said lower switch electrode means at at least one location within each switch area of the array;
within each switch area of the array, said upper and lower switch electrode means together comprising the contacts of a normally open switch which may be closed by application of pressure to said flexible film means within said switch area;
legend means disposed beneath said lower surface of said switch substrate means for indicating the functions of the individual switch areas;
means for selectively obscuring images viewed through selected ones of said switch areas in accordance with external control signals, said means for obscuring comprising liquid crystal display means disposed between said switch substrate means and said legend means, said liquid crystal display means comprising:
transparent electrically insulating display substrate means having upper and lower surfaces;
transparent display lower electrode means disposed on said upper surface of said display substrate means;
a layer of a nematic liquid crystal disposed over said upper surface of said display substrate means and said lower display electrode means;
transparent display faceplate means disposed over said layer of liquid crystal material;
transparent upper display electrode means disposed on said display faceplate means, interposed between said faceplate means and said liquid crystal at least in selected locations and overlapping said lower display electrode means within areas aligned with selected switch areas;
said upper and lower display electrodes being configured to define liquid crystal display areas which are substantially coextensive with switch areas vertically aligned therewith, said display areas being selectively controllable for obscuring images viewed through said display areas and the aligned switch areas, in accordance with an external display control signal whereby the legend associated with an individual switch area may be obscured in response to said external control signals to indicate that the associated switch should not be activated.

4,017,849

APPARATUS FOR ANALOG TO DIGITAL CONVERSION

Stuart Keene Tewksbury, Middletown, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Aug. 28, 1975, Ser. No. 608,524
Int. Cl.² H03K *13/22*
U.S. Cl. 340—347 AD **7 Claims**



1. A differential pulse code modulation encoder for converting an analog input signal to a digital output signal, said output signal representing the difference between said input signal and a decoded version of said output signal, comprising
a comparator for generating an error signal formed by subtracting said decoded version of said output signal from said input signal,
quantizing means substantially instantaneously responsive to said comparator for generating said digital output signal by sampling said error signal and converting said samples to digital form, and
means for generating said decoded version of said output signal characterized by a digital to analog converter for generating an intermediate analog signal in response to said digital output signal, a serial chain of at least three integrators for receiving said intermediate analog signal, and means for summing the outputs of each of said integrators of said chain.

4,017,850

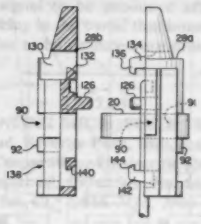
MAGNETIC KEYSWITCH WITH TWO-PIECE SUPPORT ASSEMBLY

Edward W. Wanatowicz, Jr., Elk Grove Village, Ill., assignor to Illinois Tool Works Inc., Chicago, Ill.

Filed Feb. 2, 1976, Ser. No. 654,429
Int. Cl.² G08C *1/00*
U.S. Cl. 340—365 L **10 Claims**

1. A keyboard switch comprising a housing, an actuating member and at least one permanent magnet coupled to said actuating member so as to change from a first position to a second position when said actuating member is actuated, a support assembly comprising at least one magnet core, a drive wire threaded through said core, at least one sense wire threaded through said core and an electrically insulating support element for supporting said magnetic core in a loosely retained manner and for also supporting said drive and sense wires, said drive and sense wires being configurated so that their terminating permanent ends may be connected into the apertures of a printed circuit board, said magnetic core being magnetically saturated when said permanent magnets are in

one of their positions and said magnetic core being unsaturated when said permanent magnets are in other of their positions, said support assembly comprising two substantially identical molded plastic members which receive said core

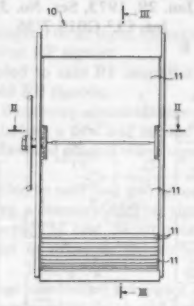


therein and interlocking, snapped-together retention means provided on said plastic members whereby the insertion of said core and said drive and sense wires may be achieved at a location remote from the location at which said plastic members are molded.

4,017,851
POSITION-CONTROL MECHANISM FOR STEPWISE ROTATING MEMBERS

Fortunato Felice, Udine, Italy, assignor to Solari & C. Udine S.p.A., Udine, Italy

Filed Aug. 27, 1975, Ser. No. 608,325
Claims priority, application Italy, Sept. 4, 1974, 26931/74
Int. Cl.² G08B 5/00
U.S. Cl. 340—379 **2 Claims**

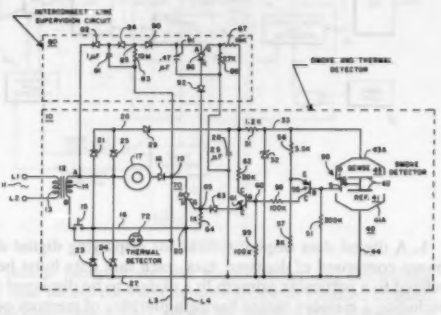


1. In a signalling apparatus including a signalling member, a step-by-step polarized motor having a rotor provided with a succession of poles of alternate polarity and a stator provided with two pole shoes alternately excited with different polarities, continuous drive transfer means connecting the signalling member to the motor rotor in such a manner as to cause the signalling member to be rotated stepwise at a speed which is a first integral submultiple of the rotating speed of the motor rotor, first sensing means for sensing the steps of rotation of the signalling member and second sensing means for sensing the passage of the signalling member through a predetermined angular position, the improvement comprising a rotating magnet having opposite poles, said first and second sensing means being constituted by respective first and second magneto-sensitive members, said first magneto-sensitive member being located in a fixed position near the rotor of the motor so as to sense successively the passage of the poles of the said rotor during rotation thereof and the second magneto-sensitive member being associated in a fixed position relative to said rotating magnet so as to sense the passage of one of the poles thereof at each rotation of said rotating magnet, discontinuous drive transfer means connecting said rotating magnet to the motor rotor in such a manner that each rotation of the motor rotor causes the rotating magnet to be rotated at the same speed thereof through a step of rotation which is a second integral sub-multiple of a complete rotation of the rotating magnet, said first and second submultiples being equal to one another so that the rotating magnet makes a complete rotation for each rotation of the signalling member.

4,017,852
APPARATUS FOR SUPERVISING LEADS INTERCONNECTING A PLURALITY OF SELF-CONTAINED ABNORMAL CONDITION SENSING AND ALARM ANNUNCIATING UNITS

John L. Kabat, Bloomington, Minn., assignor to Honeywell Inc., Minneapolis, Minn.

Filed June 24, 1976, Ser. No. 699,420
Int. Cl.² G08B 17/00
U.S. Cl. 340—409 **4 Claims**



1. An alarm system comprising:

a. a plurality of self-contained abnormal condition sensing and alarm annunciating units with each of said units comprising:
   i. a pair of terminals adapted to be connected to a source of alternating current electric power;
   ii. an alarm annunciator;
   iii. normally open switch means;
   iv. condition sensing means including means connected to said normally open switch means and responsive to an abnormal condition for causing said normally open switch means to close;
   v. diode means; and
   vi. means connecting said annunciator, said diode means and said normally open switch means in series and to said terminals whereby closing of said normally open switch means functions to allow half wave current to flow through said alarm annunciator to thereby annunciate an alarm;

b. a pair of leads interconnecting said plurality of units, said leads being connected respectively to opposite sides of said normally open switch means of said units whereby operation of the condition sensing means of any of said units in response to an abnormal condition functions to close its associated switch means to thus actuate the alarm annunciators of all of said units;

c. second diode means connected across said interconnecting leads and poled in opposition to said first-recited diode means; and

d. line supervision means integral with at least one of said units and being connected to said interconnecting leads and to the normally open switch means of said one of said units, said line supervision means including circuit means which cause half wave current flow through said second diode means as long as there is line continuity in said interconnecting leads, said circuit means further having means responsive to an interruption of such half wave current flow through said second diode means so as to cause said one of said normally open switch means to intermittently close and open to thereby actuate its asso-

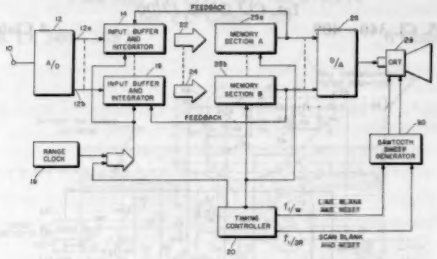
ciated alarm annunciator to produce an intermittent alarm.

4,017,853

RADAR DISPLAY SYSTEM

Ruy L. Brandao, and Robert A. Taylor, both of Fort Lauderdale, Fla., assignors to The Bendix Corporation, Southfield, Mich.

Filed July 11, 1975, Ser. No. 595,967
Int. Cl.² G01S *9/02*; G11C *8/00*
U.S. Cl. 343—5 DP **3 Claims**



1. A digital data display system for displaying digital data bursts comprised of digitized data, each said data burst being related to a particular azimuth line of data to be displayed and including a memory means having a plurality of memory cells, said memory means being divided into groups of memory cells, each said group being associated with and for storing one of said data bursts, and addressing means for addressing each memory cell, seriatim, of a particular group at least twice before addressing the memory cells of a successive group, said display system having display means normally responsive to the data stored in a memory cell being then addressed and an input buffer for storing said data bursts prior to being stored in said memory means and until the particular group of memory cells associated with a data burst stored in said input buffer is addressed by said addressing means, said input buffer and memory means being responsive when the group of memory cells associated with a data burst stored in said input buffer is addressed for storing said data burst stored in said input buffer into its associated group of memory cells, said addressing means including means for suppressing said response of said input buffer and memory means to enter data bursts into said memory means after a group of cells is addressed once and until a subsequent group of cells is addressed.

4,017,854

APPARATUS FOR ANGULAR MEASUREMENT AND BEAM FORMING WITH BASEBAND RADAR SYSTEMS

Gerald Fred Ross, Lexington, Mass., assignor to Sperry Rand Corporation, New York, N.Y.

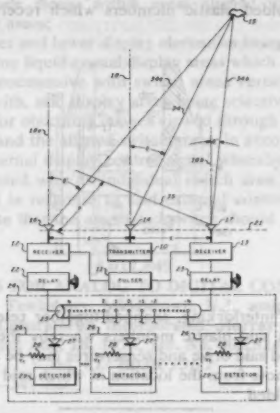
Filed Aug. 21, 1975, Ser. No. 606,673
Int. Cl.² G01S *9/02*, *3/50*
U.S. Cl. 343—16 R **5 Claims**

1. An apparatus for angular measurement and beam forming with baseband radar systems comprising:

transmitter means for radiating baseband electromagnetic pulses to illuminate an object to be detected;

first and second receiver means spaced apart and symmetrically disposes with respect to said transmitter means for receiving baseband electromagnetic pulses reflected from said object; and

means cooupled to said first and second receiver means for determining the time delay between the reception of said reflected baseband pulse at said first receiver means and the reception of said reflected baseband pulse at said second receiver means said time delay determining said angular position of said object within a beam in space having an effective beam width that is a function of the



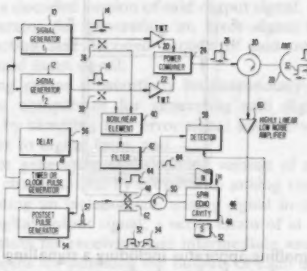
ratio of the width of said baseband pulse to said spacing between said receiver means.

4,017,855

SPIN ECHO MATCHED FILTER ECM DETECTOR

Daniel C. Buck, Hanover, and Dickron Mergerian, Baltimore, both of Md., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Jan. 29, 1973, Ser. No. 327,538
Int. Cl.² G01S *7/36*
U.S. Cl. 343—18 E **11 Claims**



1. An intermodulation product frequency detector of a received RF signal comprising in combination:

a first and second RF source respectively generating transmitted pulses of a first and second instantaneous carrier frequency simultaneously and having a predetermined frequency difference therebetween;

means coupled to said first and second RF source for sampling a portion of said pulses transmitted and providing a composite RF pulse therefrom having intermodulation product frequencies substantially the same as those to be detected;

a spin echo system operable as a matched filter coupled to said above recited means and having a microwave cavity with a paramagnetic sample located therein tuned to a paramagnetic resonance center frequency in the region of said intermodulation product frequencies, said spin echo system receiving as a first input signal said composite RF pulse;

another RF source generating a RF pulse having a bandwidth substantially covering the frequency spectrum of said intermodulation product frequencies after a prede-

termined time delay and including means coupling said RF pulse as a second input to said spin echo system for setting the spin system of the paramagnetic sample to said composite RF pulse; and

relatively highly linear circuit means coupling said received RF signal to said spin echo system, said RF signal causing a spin echo signal to be produced after said predetermined time delay in the event that intermodulation product frequencies to be detected are present.

4,017,856

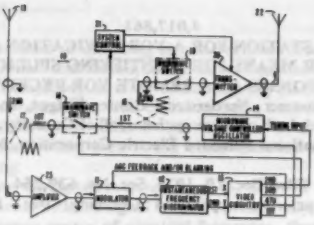
SELF-CALIBRATING MICROWAVE TRANSPONDER

Richard J. Wiegand, Severna Park, Md., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Mar. 10, 1976, Ser. No. 665,464

Int. Cl.² G01S 7/38, 7/40

U.S. Cl. 343—18 E **9 Claims**



1. A self-calibrating microwave transponder for generating RF signals in response to the carrier frequency of received RF signals comprising:

an RF amplifier coupled to an input for receiving and amplifying said received RF signals;

a modulator coupled to said RF amplifier for limiting the amplitude of said RF signals;

an instantaneous frequency discriminator coupled to said modulator and having a first and second output terminal for providing a first and second video signal in response to said RF signals;

circuit means coupled to said first and second output terminal for generating a memory address signal;

memory means coupled to said circuit means for providing a memory output in response to said memory address signal;

a microwave voltage controlled oscillator coupled to said memory means and responsive to said memory output for providing an RF output signal; and

self-calibrating means for storing voltage values into said memory means.

4,017,857

COMPUTER TIME CLOCK

Howard M. Evans, Jr., 6043 Bayou Grande Blvd., NE., St. Petersburg, Fla. 33703, and Lawrence F. Trodd, 3621 19th St., North, St. Petersburg, Fla. 33713

Filed Mar. 3, 1975, Ser. No. 555,079

Int. Cl.² G01B 9/00; G01D 15/34; G11B 25/04

U.S. Cl. 346—33 M **8 Claims**

1. A time recording system primarily designed for use in a computerized time accounting system, said time recording system comprising: information card means configured and dimensioned to include predetermined segregated portions, said information card means comprising a magnetic portion thereon, recording clock means including an inlet aperture and an outlet aperture disposed in aligned relation to one another, card passageway means disposed at least in part on the interior of said recording clock means and in interconnected relation between said inlet and outlet apertures, card transporting means comprising drive roller means disposed in said passageway means in driving engagement with said information card means passing therealong; electromagnetic encoder means including clock means and converter means electrically connected to one another such that information signals are sent to said converter means from said clock means, said electromagnetic encoder means further comprising electromagnetic write means electrically connected to said converter means and in predetermined location adjacent to said card passageway means and in operative relation to said magnetic portion of said information card means, whereby information is encoded thereon, said electromagnetic encoder means further comprising printer means electrically connected to said converter means to receive actuating signals therefrom, whereby information is printed on said information

card means; recorder/encoder means comprising electromagnetic read means disposed in predetermined location adjacent to said information card means for reading time information on said magnetic portion, said recorder/encoder means further comprising memory means disposed in electrical communication with said electromagnetic read means, whereby said time information from said information card means is stored; said read means disposed in electromagnetic communication with a predetermined portion of said recorder/encoder means, said memory means disposed in electrical communication with said electromagnetic read means, said electromagnetic encoder means is in electromagnetic communication with a predetermined portion of said recorder/encoder means and in direct electrical communication with said memory means.

4,017,858

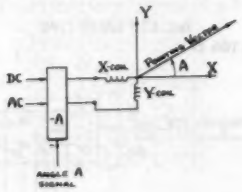
APPARATUS FOR GENERATING A NUTATING ELECTROMAGNETIC FIELD

Jack Kuipers, Grand Rapids, Mich., assignor to Polhemus Navigation Sciences, Inc., Burlington, Vt.

Division of Ser. No. 383,688, July 30, 1973, Pat. No. 3,868,565. This application Feb. 24, 1975, Ser. No. 552,339

Int. Cl.² G01R 33/02; G01S 1/02

U.S. Cl. 343—100 R **4 Claims**



2. Apparatus for generating a nutating electromagnetic field which comprises:

a. at least two orthogonal radiators adapted to pass a current; and

b. means for supplying the appropriate mixture of signals from sources supplying a DC signal, and a first AC signal to the radiators such that the electromagnetic field generated by

the currents in the radiators is caused to nutate about an arbitrarily specified pointing vector of the field.

4,017,859

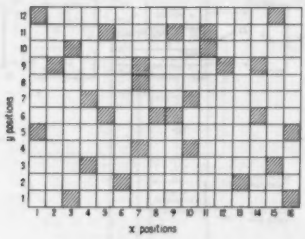
MULTI-PATH SIGNAL ENHANCING APPARATUS

Herman Medwin, Pebble Beach, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Dec. 22, 1975, Ser. No. 643,047

Int. Cl.² G01S 1/02; H04B 1/18

U.S. Cl. 343—100 CL 5 Claims



1. Signal-processing apparatus for enhancing the signal strength of multi-path signals derived from a signal source, comprising:

a signal-processing channel for each of said derived multi-path signals, each channel including:

a directional signal-energy transducer,

a signal-processing receiver coupled to the transducer output,

an A/D converter for said receiver output, and

a FFT digital computer coupled to said converter, said computer providing a plurality of data outputs each containing the amplitude and phase information of each of a plural number of frequencies present in said signal energy,

means for constructively adding in-phase the amplitude information of each identical frequency present in each of said channels, and

means coupled to said adding means for totalling the adder outputs for providing an output representative of the combined signal strength of fluctuating multi-path signal energy.

4,017,860

RADIO NAVIGATION BEACON

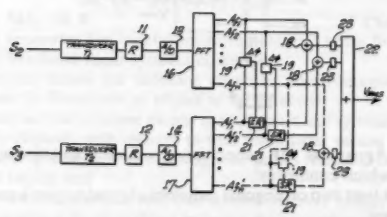
Charles W. Earp, London, England, assignor to International Standard Electric Corporation, New York, N.Y.

Filed July 21, 1975, Ser. No. 597,369

Claims priority, application United Kingdom, July 30, 1974, 33574/74

Int. Cl.² G01S 1/40

U.S. Cl. 343—106 D 9 Claims



1. In a radio navigation device, the combination comprising:

an antenna array of m elements in a plane, said array having x and y mutually orthogonal coordinates where m x y;

and ordering means for providing a program of utilization in n successive steps, one pair of said elements being utilized during each of said steps, the elements of said pairs utilized during any one step being at the same coordinate position in a first of said coordinates and being spaced a distance along the second of said coordinates which remains fixed during each of said steps but changes a varying amount in a predetermined sense between successive ones of said steps, said programming further being such as to cause said first coordinate position of the elements of said pair along said first coordinate and the mean coordinate position of said elements of the n pairs of elements along said second coordinate to vary by differing amounts between succeeding ones of said steps.

4,017,861

GROUND STATION FOR A VOR NAVIGATION SYSTEM WITH MEANS FOR IDENTIFYING SPURIOUS RESPONSES AT A REMOTE VOR RECEIVER

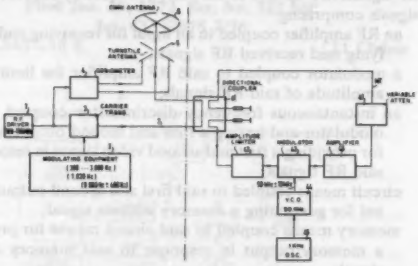
Leopold Wimmer, Norderstedt; Günter Höfgen, and Werner Poschadel, both of Kornwestheim, all of Germany, assignors to International Standard Electric Corporation, New York, N.Y.

Filed Dec. 10, 1975, Ser. No. 639,254

Claims priority, application Germany, Dec. 11, 1974, 2458708

Int. Cl.² G01S 1/44

U.S. Cl. 343—106 R 13 Claims



1. In a ground station for VOR navigation having at least one transmitter and a plurality of radiating devices, said station radiating azimuth-dependent and azimuth-independent information, said azimuth-dependent information comprising a wave effectively amplitude-modulated at 30 Hz in the field, said azimuth-dependent information being generated by superposition of a nondirectionally radiated VHF carrier on a VHF figure-eight directional pattern, the latter being effectively rotated at an equivalent rate of 30 Hz, and said azimuth-independent reference wave comprising a 30 Hz wave contained as frequency modulation on a 9960 Hz subcarrier wave, said frequency modulated wave being a subcarrier itself contained on said VHF carrier by amplitude modulation, the combination comprising:

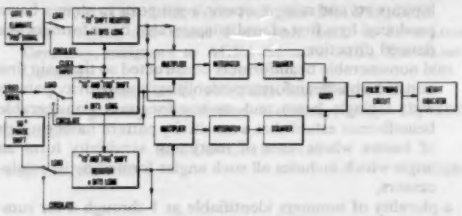
first means responsive to said VHF carrier for diverting a portion of said carrier and for eliminating modulation therefrom to provide an unmodulated VHF signal at the frequency of said carrier;

and second means for amplitude modulating said unmodulated VHF signal to produce a first remodulated signal with a frequency lying between the frequencies of a pair of harmonics of the modulation frequency occurring at the limits of the bandwidth of a responsive airborne receiver set to a channel adjacent to the channel of transmission of said transmitter.

4,017,862
AIRCRAFT GUIDANCE SYSTEM

John Paul Wild, Strathfield, Australia, assignor to Commonwealth Scientific and Industrial Research Organization, Campbell, Australia

Filed Oct. 15, 1974, Ser. No. 514,713
Claims priority, application Australia, Oct. 15, 1973, 5243/73
Int. Cl.² G01S 1/18
U.S. Cl. 343—108 M 5 Claims



1. A method of decoding signals received from a moving source ground installation, for an aircraft guidance system of the type comprising an array of transmitting elements located on the arc of a circle, said elements being activated progressively at the same radio frequency, first in one direction around the arc and then in the other direction said method comprising:

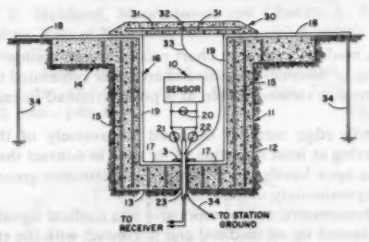
i. mixing the signals received from the array of transmitting elements with the signal from a continuously transmitting reference source of constant frequency, thereby obtaining, for each sweep of the signal from the array, a wave train in which the beat frequency varies progressively, and

ii. cross-correlating the wave trains thus obtained from consecutive to and fro sweeps of the signal from the array to establish the time delay between them.

4,017,863
HARDENED ELECTROMAGNETIC WAVE ENERGY SENSOR

Nelson B. Tharp, Ellicot City, Md.; John W. Henry, Paeonian Springs, Va., and George F. Leydorf, Birmingham, Mich., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Mar. 10, 1976, Ser. No. 665,668
Int. Cl.² H01Q 1/04
U.S. Cl. 343—719 10 Claims



1. Apparatus for hardening an electromagnetic wave energy sensor comprising, in combination

a concrete housing embedded in the ground and adapted to accommodate said sensor at a below ground location, said housing being constructed with an opening which is located at ground level;

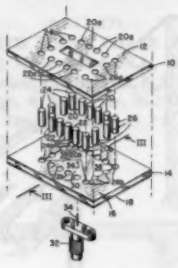
a cage formed by a plurality of conductors supported by said housing and partially surrounding said sensor, each conductor of said cage having a horizontal length portion which extends outside of said housing whereby electromagnetic wave energy appearing in the vicinity of said housing produces a current flow in said cage that provides signal coupling to said sensor; and

a protective cover closing the opening of said housing.

4,017,864
MODE-LAUNCHER FOR SIMULATED WAVEGUIDE

David Proctor, San Diego, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Continuation-in-part of Ser. No. 585,142, June 9, 1975. This application July 17, 1975, Ser. No. 596,930
Int. Cl.² H01Q 13/10
U.S. Cl. 343—767 8 Claims



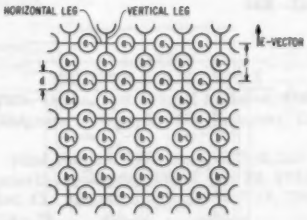
1. In a coaxial to waveguide transition assembly including a coaxial connector having an inner conductor and an outer conductor, a waveguide having a conducting backwall electrically and mechanically connected to said coaxial connector outer conductor, said waveguide having top and bottom walls, sidewalls and a frontwall radiating slot, the improvement comprising:

a triangular conducting element having an apex and first and second vertices, said element being disposed intermediate said conducting backwall and said frontwall radiating slot, said element being electrically connected to said coaxial connector inner conductor.

4,017,865
FREQUENCY SELECTIVE REFLECTOR SYSTEM

Oakley McDonald Woodward, Princeton, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Nov. 10, 1975, Ser. No. 630,696
Int. Cl.² H01Q 19/14
U.S. Cl. 343—781 CA 9 Claims



1. A self-supporting reflector adapted to pass signals at frequency f_1 and reflect signals at a higher frequency f_2 comprising:

a plurality of conductive square grids having equal length connecting legs of conductive material, at least some of said legs including a conductive ring of a diameter approximately one-third wavelength long at the frequency f_2

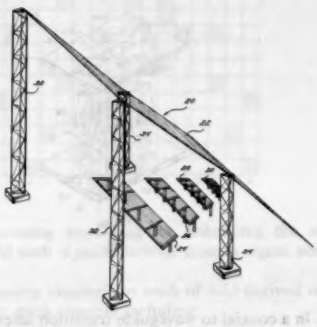
to reflect signals at frequency f_2, said legs being of a selected length and construction such that the inductive reactance presented by said legs at frequency f_1 equals the capacitive reactance of said rings at frequency f_1 giving parallel resonance and said reflector passes signals at frequency f_1 with low attenuation.

4,017,866

LOG SEQUENTIAL ANTENNAS

Homer A. Ray, Jr., Dallas, Tex., assignor to Continental Electronics Manufacturing Co., Dallas, Tex.

Filed June 19, 1975, Ser. No. 589,155
Int. Cl.² H01Q *11/10*
U.S. Cl. 343—792.5 **7 Claims**



1. A log sequential antenna array for high frequency broadcasting and for communication systems comprising:

a. a plurality of feed antennas;

b. a single slanted reflector screen positioned above and overlying all of said feed antennas said slanted reflector screen having its lower end attached to the surface of the earth; and

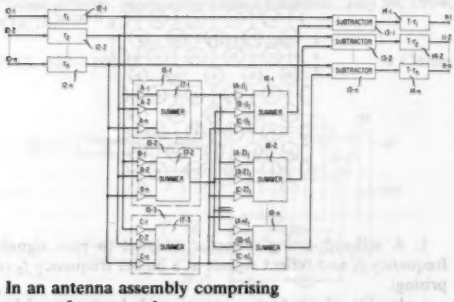
c. means for adjusting the angle between the screen and the ground from about 8° to 45° whereby said angle is adjustable for optimum performance at any given frequency for any given target area.

4,017,867

ANTENNA ASSEMBLY PRODUCING STEERABLE BEAM AND NULL

Alfons Jozef Claus, Morristown, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Feb. 25, 1976, Ser. No. 661,060
Int. Cl.² H01Q *3/26*; G01S *3/86*
U.S. Cl. 343—854 **4 Claims**



1. In an antenna assembly comprising

an array of antenna elements,

a steerable beamformer which when connected to said elements establishes a sensitivity pattern containing a steerable beam, and

a processor having input ports identifiable as 1 through n and output ports identifiable as 1 through n, said processor being connected between said elements and said steerable beamformer for reducing the sensitivity of said assembly in a steerable direction,

an improvement CHARACTERIZED IN THAT said processor comprises

at least two nonsteerable beamformers having their input ports connected in common,

means connected between said nonsteerable beamformer input ports and said processor input ports to steer a beam produced by a first of said nonsteerable beamformers in a desired direction,

said nonsteerable beamformers constructed so that said first nonsteerable beamformer establishes a sensitivity pattern with a single beam and each subsequent nonsteerable beamformer establishes a sensitivity pattern having a pair of beams whose axes of maximum sensitivity form an angle which includes all such angles formed by its predecessors,

a plurality of summers identifiable as 1 through n for summing predetermined portions of the outputs from said nonsteerable beamformers, and

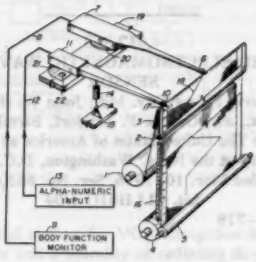
means for subtracting the output of each of said summers from the input to the similarly identified processor input port and applying the difference to the similarly identified processor output port, whereby signals in said differences have the same phase relations with respect to one another as they have in said processor inputs.

4,017,868

THERMAL RECORDER

Daniel William Keating, Wayland, Mass., assignor to American Optical Corporation, Southbridge, Mass.

Filed Nov. 28, 1975, Ser. No. 636,329
Int. Cl.² G01D *9/28*, *15/10*
U.S. Cl. 346—61 **7 Claims**



1. A medical data strip chart recorder comprising:

a strip of thermally sensitive chart paper controlled to move across a viewing platen at a predetermined linear velocity;

a knife edge member disposed transversely of the strip having at least a portion of its apex in contact therewith, the apex having a cord length and diameter greater than approximately 0.062 inch;

a galvanometric stylus responsive to a medical signal having a heated tip on its distal end in contact with the strip in a region of contact with the apex of the knife edge, thereby recording analog signals relative to the medical signal; and

a thermal printout head mounted to the distal underside of an extended cantilever arm having a matrix of resistively heated elements which when selectively energized imprint a predetermined digital code on the strip, the matrix comprising a single row of the heated elements, the row arrayed transversely of the strip having a dimension of approximately 0.1 inch in the transverse direction and a dimension of approximately 0.01 inch longitudinally of

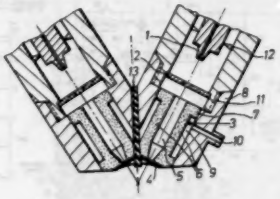
the strip, the arm being resiliently urged and positioned so as to place the head in contact with the strip in the region of contact with the knife edge, the head being transversely aligned with the heated tip and responsive to a second medical signal thereby imprinting on the strip digital indicia relative thereto in time registration with the analog signals.

4,017,869

INK RECORDER FOR THE JET-INK-PROCESS

Rudolf Meyer, and Klaus Hoffmann, both of Leverkusen, Germany, assignors to AGFA-Gevaert, A.G., Leverkusen, Germany

Filed July 8, 1975, Ser. No. 594,110
Claims priority, application Germany, July 13, 1974, 2433719
Int. Cl.² G01D *15/18*
U.S. Cl. 346—75 7 Claims



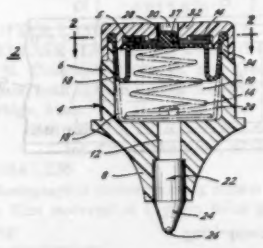
1. An ink recorder comprising a recording support; nozzles for producing at least three differently colored ink jets which are directed on to a common point lying in the plane of the recording support; and a control electrode for each nozzle, an extraction system for the ink which is not required for recording and an apertured diaphragm associated with each nozzle, the control electrodes, extraction systems and diaphragms being combined into a block, the control electrodes being electrically insulated with respect to one another and with respect to earth and the nozzles being at electrical earth potential, each nozzle and its associated control electrode, extraction system and diaphragm being concentrically disposed about a nozzle centerline, and each nozzle centerline being disposed along the generatrix of a cone whose apex is the common point.

4,017,870

TRUNCATED BALL PEN

James R. Hubbard, Moorestown, and Charles A. Erdman, Marlton, both of N.J., assignors to Graphic Controls Corporation, Cherry Hill, N.J.

Filed Feb. 26, 1976, Ser. No. 661,815
Int. Cl.² G01D *15/16*; B43K *5/04, 7/00*
U.S. Cl. 346—140 A 10 Claims



1. A pen, designed to have a large internal volume contained within a short length body, comprising in combination:

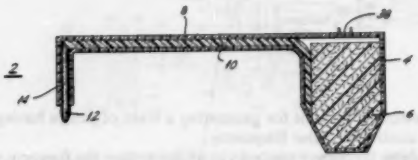
a. a short axial length wide diameter barrel, said barrel having a proximal end and a distal end;
b. an ink reservoir housed inside of said barrel;
c. a writing tip assembly, one end thereof extending from a bore in said proximal end of said barrel to contact a writing surface, the other end thereof mating with said ink reservoir inside of said barrel;
d. pressure regulation means housed within said barrel adapted to exert a constant pressure across the entire cross-sectional area of said ink reservoir and in the direction of said writing tip assembly; and
e. a rollable fluid impervious diaphragm inserted inside of said barrel adapted to separate said ink supply from said pressure means.

4,017,871

MARKER WITH THREE PHASE INK CIRCUIT

James R. Hubbard, Moorestown, N.J., assignor to Graphic Controls Corporation, Cherry Hill, N.J.

Filed Feb. 9, 1976, Ser. No. 656,333
Int. Cl.² G01D *15/16*
U.S. Cl. 346—140 R 13 Claims



1. A pen, designed to include a writing tip remote from the pen's ink supply, including in combination:

a. a reservoir body;
b. capillary reservoir material, housed inside of said reservoir body, having a degree of capillarity suitable to retain an ink supply under normal handling, yet able to release the ink to a member of preferred capillarity;
c. an intermediate conduit having a distal end and a proximal end;
d. intermediate capillary material, housed inside of said intermediate conduit having a higher degree of capillarity than said capillary reservoir material, said intermediate capillary material to have both a distal and proximal end;
e. a generally porous writing tip, having a higher degree of capillarity than said intermediate capillary material, said distal end of said intermediate capillary material mating with said capillary reservoir material, and said proximal end of said intermediate capillary material mating with said writing tip.

4,017,872

SHUTTER FOR CAMERA

Hiroshi Iwata, Osaka, and Katsuji Ishikawa, Daito, both of Japan, assignors to West Electric Company, Ltd., Osaka, Japan

Filed Feb. 18, 1975, Ser. No. 550,367
Claims priority, application Japan, Feb. 22, 1974, 49-21153
Int. Cl.² 354 *60 A, 234*; G03B *7/14, 7/08*
U.S. Cl. 354—29 4 Claims

1. The shutter for cameras comprising

a. shutter blades, shutter driving means for opening and closing said shutter blades in a succession of incremental opening motions, each of said incremental opening motions being in response to a concurrence of a shutter driving pulse and a first driving direction signal, said shutter driving means further comprising means for closing said shutter blades in a succession of incremental closing motions, each of said incremental closing motions

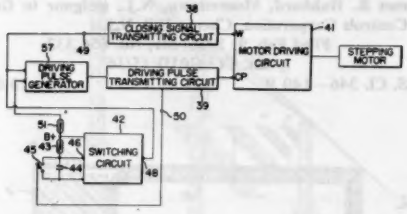
being in response to a concurrence of a shutter driving pulse and a second driving direction signal,

b. a first brightness detecting element connected to said switching circuit for providing a first brightness signal proportional to the integral with respect to time of said brightness,

c. a second brightness detecting element for providing a second brightness signal,

d. switching circuit means connected to said first brightness detecting element for providing a first switching circuit output in response to a level of said first brightness signal below a predetermined signal level and for providing a second switching circuit output in response to a level of said brightness signal above said predetermined signal level,

e. a shutter driving pulse generator connected to said switching circuit means and to said second brightness



detecting element for generating a train of pulses having a controlled pulse frequency,

f. a pulse frequency control circuit for setting the frequency of said pulse generator to a first frequency varying as a function of the magnitude of said second brightness signal in response to said first switching circuit output and for setting the frequency of said pulse generator to a second predetermined frequency higher than said first frequency in response to said second switching circuit output,

g. a pulse transmitting circuit means for transmitting said shutter driving pulses from said shutter driving pulse generator to said shutter driving means for a predetermined time, and

h. a driving direction indicating circuit for generating said first and second driving direction signals in response to said first and second switching circuit outputs from said switching circuit means to said first and second switching circuit outputs from said switching circuit means

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4,017,873

EXPOSURE CONTROL SYSTEM WITH BRAKING CAPABILITY

Edwin K. Shenk, Westford, and Jüerg Muggli, Woburn, both of Mass., assignors to Polaroid Corporation, Cambridge, Mass.

Filed Oct. 3, 1975, Ser. No. 619,385
Int. Cl.² G03B 7/14
U.S. Cl. 354—29 **22 Claims**

1. A photographic camera comprising:

a housing;

an objective lens mounted on said housing;

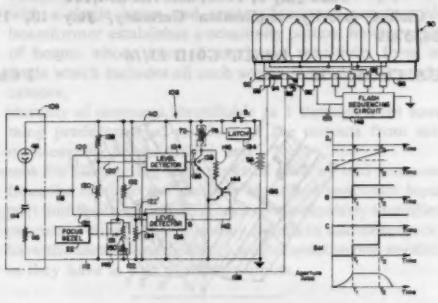
means within said housing for receiving a source of electrical energy;

means within said housing for defining a film exposure plane;

a blade assembly mounted and arranged within said housing for displacement from an initial closed arrangement wherein said blade assembly precludes scene light from impinging on said exposure plane to a second arrangement wherein said blade assembly defines a maximum aperture through which scene light is permitted to impinge on said exposure plane and then to a final closed arrangement wherein said blade assembly again precludes scene light from impinging on said exposure plane, such a displacement of said blade assembly serving to define an exposure interval during which scene light is incident upon said film exposure plane;

scene light detecting means energizable by the source of electrical energy for providing an output signal in correspondence to the amount of scene light detected subsequent to the commencement of an exposure interval; and

means, at least in part energizable by the source of electrical energy, for intiating the displacement of said blade assembly from its said initial closed arrangement towards its said second arrangement thereby commencing a particular exposure program defined by a plurality of exposure parameters and then, responsive to said output signal of



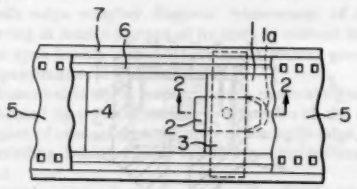
said scene light detecting means reaching a first predetermined value, for effecting the displacement of said blade assembly into its said final closed arrangement, and, responsive to said output signal of said scene light detecting means reaching a second predetermined value less than said first predetermined value prior to said blade assembly reaching its said second arrangement, for effecting a modification of a characteristic of a given exposure parameter associated with said particular exposure program from the character said given exposure parameter assumes in situations wherein said blade assembly arrives at its said second arrangement before said output signal of said scene light detecting means reaches its said second predetermined value.

4,017,874

LIGHT INTERCEPTING DEVICE FOR DATA PHOTOGRAPHING CAMERAS

Sachio Ohmori, Yokohama, Japan, assignor to Nippon Kogaku K.K., Tokyo, Japan

Filed June 12, 1975, Ser. No. 586,410
Claims priority, application Japan, June 21, 1974, 49-71875[U]
Int. Cl.² G03B 17/24
U.S. Cl. 354—108 **5 Claims**



1. In a camera comprising:

a camera body;

a camera aperture defined by said camera body;

lens means disposed on one side of said camera body for directing light through said camera aperture; and

a film guide mounted on the other side of said camera body to guide a length of film relatively to said aperature;

a light intercepting device which comprises:

a light intercepting member extending into said camera aperture for intercepting a part of the light passing through said camera aperture; and

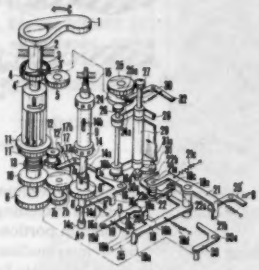
fitting means formed of a resilient member and a part of said camera body cooperating therewith provided on said one side of said camera body for frictionally receiving said light intercepting member in an attachable and detachable manner.

4,017,875

CAMERA ALLOWING MULTIPLE EXPOSURE

Masayoshi Yamamichi, Kawasaki, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 26, 1975, Ser. No. 607,914
Claims priority, application Japan, Aug. 29, 1974, 49-99123
Int. Cl.² G03B 19/12
U.S. Cl. 354—209 **3 Claims**



1. A single lens reflex camera for multiple exposure photography including a shutter comprising:

winding means for shutter cocking;

film takeup means linked with said winding means;

manually operable clutch means normally maintained in an engaged position;

a film advancing sprocket linked with said film takeup means through said manually operable clutch means;

operating means for manually operating said clutch means;

displaceable retaining means adapted to be engaged with said operating means for retaining said clutch means in a disengaged position;

shutter releasing means; and

relieving means performing a reciprocating motion linked with said shutter releasing means; said relieving means actuating said retaining means in the advancing motion thereof to relieve said clutch means from said disengaged position to said engaged position prior to the opening function of the shutter.

4,017,876

SHUTTER LATCH SYSTEM WITH AUTOMATIC RELEASE FOR SHOCK DAMPING MEMBER

Edward H. Coughlan, Dedham, and George D. Whiteside, Lexington, both of Mass., assignors to Polaroid Corporation, Cambridge, Mass.

Filed Jan. 13, 1976, Ser. No. 648,661
Int. Cl.² G03B 9/08, 17/38
U.S. Cl. 354—230 **6 Claims**

1. A photographic camera having means for mounting photographic film material at a given focal plane, said camera comprising:

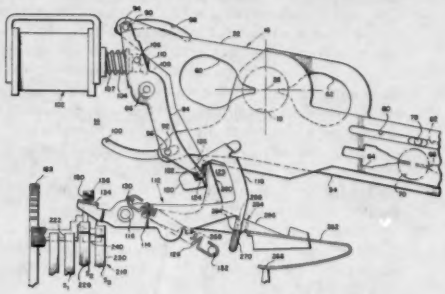
a blade mechanism;

means for mounting said blade mechanism for displacement between at least one blocking arrangement precluding transmission of scene light to the focal plane and an unblocking arrangement defining at least one aperture value structured for transmission of scene light to the focal plane;

drive means actuable for displacing said blade mechanism between its said arrangements;

latch means for initially retaining said blade mechanism in one of its said arrangements;

means at least in part electrically energizable for actuating said drive means to effect the displacement of said blade mechanism from its said arrangement wherein it is retainable by said latch means to another of its said arrangements and then back to its said arrangement wherein it is retainable by said latch means to define an exposure cycle of said blade mechanism, said latch means being structured for displacement responsive to actuation of said drive means to effect its normal release of said blade



mechanism to facilitate the movement of said blade mechanism under the influence of said drive means to define said exposure cycle, said blade mechanism also being responsive to a sudden shocking thereof for movement from its said arrangement wherein it is retainable by said latch means to another of its said arrangements; and

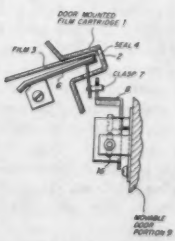
shock stabilizing means responsive to said shocking of said blade mechanism not resulting from said actuation of said drive means for prohibiting the release of said blade mechanism by said latch means, said latch means including means responsive to said displacement of said latch means to effect said normal release of said blade mechanism for inhibiting the operative influence of said shock stabilizing means on said blade mechanism until said blade mechanism is returned to its said arrangement wherein it is retainable by said latch means.

4,017,877

DEVICE FOR PREVENTING FOGGING OF FILM WITHIN A CAMERA BACK

Robert H. Powers, Rochester, N.Y., assignor to Itek Corporation, Lexington, Mass.

Filed Oct. 2, 1975, Ser. No. 618,991
Int. Cl.² G03B 17/26
U.S. Cl. 354—277 **3 Claims**



1. A movable camera back member coupled to a camera,

which is placed in a closed position with respect to said camera for exposure of photosensitive material and in an open condition for access thereto comprising:

a. a cartridge within said camera back member having a feed orifice means therein through which said photosensitive material passes;

b. a light sealing member associated with said cartrdige for sealing off said feed orifice means when said sealing member is placed in a closed position and for opening said feed orifice means when said sealing member is placed in an open position; and,

c. sealing member actuation means for causing said sealing member to be placed in said open position when said movable camera back member is placed in said closed position for exposure, and for causing said sealing member to be placed in said closed position when said movable camera back member is placed on said open position, said sealing member actuation means further including a pusher rod mounted upon said camera back housing which is translated back and forth with respect to said camera back housing upon the opening and closing of said camera back member, and wherein said pusher rod is spring biased for permitting said rod to be translated upon contacting a wall portion of said camera when said camera back member is placed in said closed position with respect to said camera, said sealing member actuation means further including a clasp member coupled to said pusher rod for actuating said light sealing member upon the translation of said pusher rod and wherein a hook member is coupled between said clasp member and said pusher rod for actuating said clasp member upon the translation of said pusher rod.

4,017,878

BAYONET MOUNT ADAPTER FOR A CAMERA

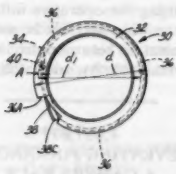
Teruo Hagiwara, Kawagoe, Japan, assignor to Asahi Kogaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed July 7, 1975, Ser. No. 593,548

Claims priority, application Japan, July 5, 1974, 49-78710[U]

Int. Cl.² G03B *17/00*

U.S. Cl. 354—286 **7 Claims**



1. A bayonet mount adapter for attaching to a camera of the bayonet type mount a lens barrel of the screw type mount having a screw mount diameter smaller than an inner claw diameter defined by the internal bayonet claws of the camera bayonet mount, said bayonet mount adapter including a substantially cylindrical sidewall portion having an outer circumference adapted to be received within the inner claw diameter and also having a resilient engaging element fixed thereto, said resilient engaging element having a first end thereof fixed to said sidewall portion and extending substantially tangentially from said sidewall portion to an opposite second end thereof disposed radially outward of the inner claw diameter, said bayonet mount adapter in a received position within the camera bayonet mount being relatively rotatable to a stop position with said resilient engaging element under the confining regulation of the internal bayonet claws and within the inner claw diameter, said resilient engaging element being free of said confining regulation at said stop position to allow movement of said second end thereof into engagement with a rotation stopper carried by the camera and located radially outward of the inner claw diameter, and said second end of said resilient engaging element being manually movable to a position radially inward of the inner claw diameter to disengage said resilient engaging element from the rotation stopper.

4,017,879

SELF-DEVELOPING TYPE PHOTOGRAPHIC APPARATUS WITH SPREAD ROLLER SYSTEM

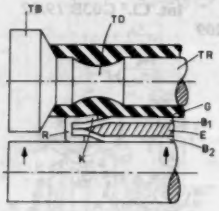
Peter Lermann, Narring; Günter Fauth, Unterhaching, and Herbert Müller, Assling, all of Germany, assignors to AGFA-Gevaert, A.G., Leverkusen, Germany

Filed Sept. 29, 1975, Ser. No. 617,448

Claims priority, application Germany, Sept. 30, 1974, 2446595

Int. Cl.² G03D *9/02*

U.S. Cl. 354—304 **12 Claims**



1. In a photographic apparatus, a combination comprising self-developing film packet means including a pair of juxtaposed sheet elements having margin portions and a supply of film-processing fluid provided intermediate said sheet elements, at least one of the sheet elements forming part of an area having border regions to be coated and thereby developed by said fluid; a pair of juxtaposed roller members defining a pressure-generating gap therebetween through which said packet means is adapted to be advanced during spreading of said fluid, one of said roller members having a first sheet-contacting surface and the other of said roller members having an outer resilient material layer forming a second sheet contacting surface; means for facilitating the uniform spreading of said fluid over said area and being located at laterally-spaced side regions of said packet means for permitting said fluid to flow over said border regions of said area; and edge-binding means for securing the opposite side regions of said juxtaposed sheet elements, each of said edge-binding means overlapping the longitudinal edges and the external surfaces of said sheet elements and having bracket portions extending inwardly away from the respectively associated longitudinal edge, one of said bracket portions projecting inwardly to a greater extent than the other of said bracket portions, said margin portions in part overlying said border regions together with said longer bracket portions, at least one of said sheet elements and said one longer bracket portion being weakened.

4,017,880

RED LIGHT EMITTING GALLIUM PHOSPHIDE DEVICE

Akinobu Kasami, Yokohama; Masaru Kawachi, Tokyo, and Hiroki Mineo, Yokohama, all of Japan, assignors to Tokyo Shibaura Electric Co., Ltd., Kawasaki, Japan

Continuation-in-part of Ser. No. 437,639, Jan. 29, 1974, abandoned. This application July 25, 1975, Ser. No. 599,098

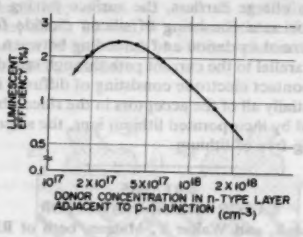
Claims priority, application Japan, Feb. 12, 1973, 48-17210

Int. Cl.² H01L *33/00*

U.S. Cl. 357—17 **6 Claims**

1. A red light emitting gallium phosphide device comprising an n-type gallium phosphide substrate, an n-type gallium phosphide layer formed on said substrate and a p-type gallium phosphide layer formed on said n-type layer to define a pn-junction contributing to emission of a red light between both

layers, wherein the n-type layer has doped oxygen having a concentration of less than 1×10^{16} cm^{-3}, the portion of the



n-type layer adjacent the pn-junction having a net donor concentration of from 1×10^{17} cm^{-3} to 5.8×10^{17} cm^{-3}.

4,017,881

LIGHT EMITTING SEMICONDUCTOR DEVICE AND A METHOD FOR MAKING THE SAME

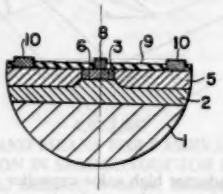
Yuichi Ono, Honde; Kazuhiro Kurata, Hachioji; Masao Kawamura, Fuchu; Makoto Morioka, Honde, and Kazuhiro Ito, Hinode, all of Japan, assignors to Hitachi, Ltd., Japan

Filed Sept. 11, 1975, Ser. No. 612,282

Claims priority, application Japan, Sept. 20, 1974, 49-107824

Int. Cl.² H01S *33/19*

U.S. Cl. 357—18 **8 Claims**



1. A high power light emitting semiconductor device comprising:

a semiconductor body which has first and second surfaces and which contains

a first semiconductor region having a third surface, the forbidden band gap width of said first semiconductor region increasing from said third surface into said first region,

a second semiconductor region of a first conductivity type, disposed on said third surface of said first semiconductor region, and having a forbidden band gap width which is narrower than the width of the forbidden gap of said first region at said third surface thereof,

a third semiconductor region of a second conductivity type, opposite said first conductivity type, disposed on a prescribed surface portion of said second semiconductor region and defining a first PN junction with said prescribed surface portion of said second semiconductor region, the width of the forbidden band gap of said third semiconductor region being narrower than the width of the forbidden gap of said first semiconductor region at said third surface, and

a fourth semiconductor region, of said first conductivity type and having an impurity concentration greater than that of said second semiconductor region, disposed on a portion of the surface of said second semiconductor region, which portion of the surface of said second semiconductor region surrounds said prescribed surface portion of said second semiconductor region, the width of the forbidden band gap of said fourth semiconductor region being narrower than the width of the forbidden gap of said first semiconductor region at said third surface;

a first electrode disposed on the surface of said third semiconductor region; and

a ring-shaped second electrode disposed on the surface of said fourth semiconductor region so as to surround said first electrode; and wherein

the surfaces of said third and fourth semiconductor regions upon which said first and second respective electrodes are disposed form the first surface of said semiconductor body, while the second surface of said semiconductor body, which extends to the first surface thereof, is hemispherically shaped.

4,017,882

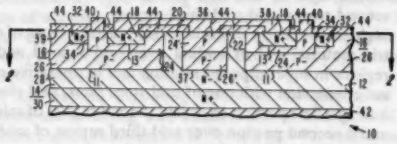
TRANSISTOR HAVING INTEGRATED PROTECTION

Peter Joseph Kannam, Princeton, and Wilfred Potter Bennett, Belle Mead, both of N.J., assignors to RCA Corporation, New York, N.Y.

Filed Dec. 15, 1975, Ser. No. 641,138

Int. Cl.² H01L *29/90, 29/72, 29/00, 27/04*

U.S. Cl. 357—13 **8 Claims**



1. An integrated transistor having a base region of a one type conductivity, a collector region of a second type conductivity adjacent to said base region and forming a base-collector PN junction at the interface therewith, an emitter region of said second type conductivity adjacent said base region and forming a base-emitter PN junction at the interface therewith, said transistor comprising:

a first protective region having said second type conductivity contacting and surrounding said base region and forming a first PN junction therewith; and

a second protective region having said one type conductivity adjacent said collector region and forming a PN diode therewith.

4,017,883

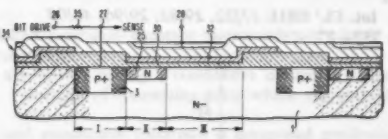
SINGLE-ELECTRODE CHARGE-COUPLED RANDOM ACCESS MEMORY CELL WITH IMPURITY IMPLANTED GATE REGION

Irving T. Ho, and Jacob Riseman, both of Poughkeepsie, N.Y., assignors to IBM Corporation, Armonk, N.Y.

Continuation of Ser. No. 159,907, July 6, 1971, abandoned. This application Sept. 24, 1973, Ser. No. 400,480

Int. Cl.² H01L *29/78*

U.S. Cl. 357—24 **5 Claims**



1. A charge coupled random access memory array comprising:

a semiconductor body having embodied therein an impurity of a first conductivity type,

a plurality of charge coupled memory cells arranged in columns and rows on said body,

bit lines extending in the column direction, each bit line in operative relation to a column of said cells,

word lines extending in the row direction, each word line in operative relation to a row of said cells,

each of said cells comprised of a first region in said semiconductor body formed of an impurity of a second opposite conductivity type, said first region of said cell in operative electrical connection with one of said bit lines,

a second region in said body in adjacent lateral relationship to said first region in the row direction and having embodied therein an impurity of a first conductivity type in a concentration greater than the concentration of the impurity in said semiconductor body,

a third region in said body in adjacent lateral relationship to said second region, and spaced from said first region by said second region and having embodied therein an impurity of a first conductivity type in a concentration less than the concentration in said second region, said third region spaced from the first region of the adjacent memory cell,

the threshold voltage of said second region being higher in absolute magnitude than the threshold voltage of said third region, the threshold voltages of said second and third regions being determined at least in part by the relative impurity concentrations in said second and third regions,

a surface layer of dielectric material overlying at least said second region and said third region,

a single conductive electrode on said surface layer of dielectric material and extending over said second and third regions in superimposed relation and in operative electrical connection with one of said word lines, said electrode having a first portion over said second region of said body and a second portion over said third region of said body,

a means of applying at least two voltage levels to said conductive electrode to control the storage of charges in, and flow of charges to, said third region, the first of said voltage levels applied to said conductive electrode is of an absolute magnitude less than said first predetermined threshold voltage of said second region, but equal to or greater than said second threshold voltage of said third region, thereby inverting only said third region for charge storage capability,

the second of said voltage levels of an absolute magnitude equal to or greater than said first predetermined threshold voltage of said second region thereby inverting both of said second and third regions for charge flow capability.

4,017,884

MAGNETIC FIELD SENSITIVE DIODE AND METHOD OF MAKING SAME

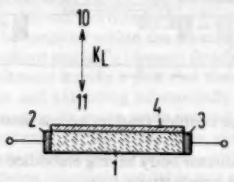
Ignaz Eisele, Ottobrunn; Hans Pfleiderer, and Ekkehard Preuss, both of Munich, all of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Germany

Continuation of Ser. No. 496,558, Aug. 12, 1974, abandoned. This application May 4, 1976, Ser. No. 683,208

Claims priority, application Germany, Aug. 13, 1973, 2340895

Int. Cl.² H01L *27/22, 29/82, 29/96, 43/00*

U.S. Cl. 357—27 **7 Claims**



1. A magnetic field sensitive diode comprising a silicon body, an n-injecting contact electrode and a p-injecting contact electrode located at spaced portions of said body, said electrodes being capable of producing n charges and p charges respectively in said body, said body having opposed parallel surfaces having different recombination rates with respect to pairs of free charge carriers, the surface having the lower recombination rate consisting of silicon dioxide formed by means of thermal oxidation and extending between said electrodes and parallel to the current path through said diode, said n-injecting contact electrode consisting of diffused in lithium, with substantially all of the acceptors in the silicon body being compensated by incorporated lithium ions, the silicon dioxide surface being free of lithium.

4,017,885

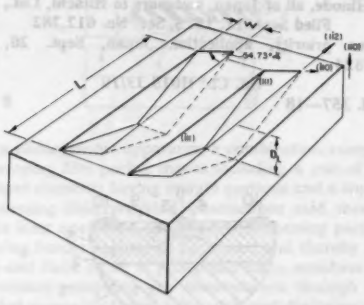
LARGE VALUE CAPACITOR

Don L. Kendall, and Walter T. Matzen, both of Richardson, Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Continuation-in-part of Ser. No. 409,509, Oct. 25, 1973, Pat. No. 3,962,713, which is a continuation of Ser. No. 259,332, June 2, 1972, abandoned. This application Dec. 13, 1974, Ser. No. 532,334

Int. Cl.² H01L *27/04, 29/04, 29/92*

U.S. Cl. 357—51 **7 Claims**



5. A semiconductor high value capacitor comprising:

a. a semiconductor substrate having a major surface oriented in a 110 plane;

b. selectively spaced, parallel grooves in said surface crystallographically oriented such that the groove sidewalls are aligned with 111 planes, two of said sidewalls being perpendicular to said 110 surface and the other two 111 sidewalls sloping from the groove ends to a central V-shaped bottom;

c. a layer of dielectric material coating said surfce;

d. a layer of conductor overlying and coating said dielectric layer and adapted to receive an electrical contact.

4,017,886

DISCRETE SEMICONDUCTOR DEVICE HAVING POLYMER RESIN AS INSULATOR AND METHOD FOR MAKING THE SAME

Masami Tomono, Kokubunji; Akira Abe, Takasaki; Seiki Harada, Hachioji; Kikuji Sato, Kokubunji; Takeshi Takagi, Takasaki; Genichi Kamoshita, Koganei; Yuichiro Oya, Kodaira, and Atsushi Saiki, Musashimurayama, all of Japan, assignors to Hitachi, Ltd., Japan

Continuation-in-part of Ser. No. 407,447, Oct. 18, 1973, abandoned. This application May 16, 1975, Ser. No. 578,174

Claims priority, application Japan, Oct. 18, 1972, 47-103588

Int. Cl.² H01L *23/30*

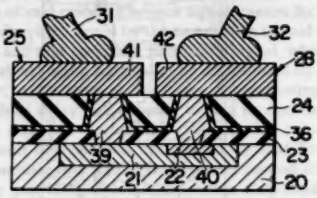
U.S. Cl. 357—54 **42 Claims**

1. A semiconductor device comprising:

a semiconductor body including a semiconductor region of a conductivity type opposite to that of the body;

an insulating layer disposed on a surface of the semiconductor body;

a polymer resin layer on said insulating layer, said polymer comprising a modified polyimide that is the reaction product of about 5 mol %, 4,4'-diaminodiphenylether-3-carbonamide; about 45 mol % 4,4'-diaminodiphenylether; about 25 mol % pyromellitic acid dianhydride; and about 25 mol % 3,3',4,4'-benzophenontetracarboxylic acid dianhydride;



an electrode reaching into a part of the semiconductor region, said electrode penetrating the polymer resin layer and the insulating layer and extending on the surface of the polymer resin layer; and

a wire bonded to said electrode.

4,017,887

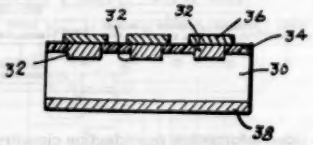
METHOD AND MEANS FOR PASSIVATION AND ISOLATION IN SEMICONDUCTOR DEVICES

D. Eirug Davies, Belmont; Sven A. Roosild, Billerica, and Russell P. Dolan, Jr., Concord, all of Mass., assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Continuation-in-part of Ser. No. 275,018, July 25, 1972, abandoned. This application Dec. 20, 1974, Ser. No. 535,062

Int. Cl.² H01L *29/34, 27/04, 29/161, 29/167*

U.S. Cl. 357—52 **5 Claims**



1. A radiation resistant semiconductor device comprising: a wafer of n-type gallium arsenide semiconductor material; islands of p-type material located in the wafer and forming a portion of the surface thereof, said p and n material so positioned as to form p-n junctions; implanted regions of compensating chromium ions having a concentration between 10^{14} to 10^{18} ions per cubic centimeter, said ions being of insufficient concentration to form a new compound, but of sufficient concentration to form a semi-insulating layer of carrier depleted gallium arsenide, having a resistivity of between 10^{6} and 10^{9} ohm centimeters, extending to the surface of the wafer and surrounding said islands of p material; and contact means affixed to the n and p material for attaching electrical conductors.

4,017,888

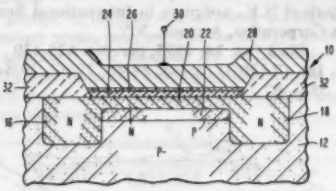
NON-VOLATILE METAL NITRIDE OXIDE SEMICONDUCTOR DEVICE

Kenneth Howard Christie, Hopewell Junction, N.Y.; David DeWitt, Los Gatos, Calif., and William Stanford Johnson, Hopewell Junction, N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 31, 1975, Ser. No. 645,770

Int. Cl.² H01L *29/34, 29/78, 29/00;* **G11B** *13/00*

U.S. Cl. 357—54 **5 Claims**



1. A memory element comprising a conductive substrate of one conductivity type having first and second spaced apart regions of another conductivity forming a source and a drain for the element, respectively, said regions being interconnected by a thin region of said other conductivity type forming a channel between the source and drain;

first and second insulating layers on the surface of said substrate overlying said channel and at least part of said source and drain regions to form a gate for said element, and

a region of material of said one conductivity type provided in the substrate contiguous with said channel, said region having an active impurity concentration higher than that of said substrate and a resistivity lower than that of said substrate.

4,017,889

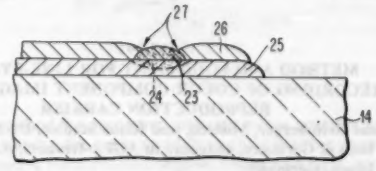
TERNARY BARRIER STRUCTURE FOR CONDUCTIVE ELECTRODES

Lewis F. Miller, LaGrangeville, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 23, 1974, Ser. No. 535,261

Int. Cl.² H01L *23/48, 29/44, 29/46*

U.S. Cl. 357—67 **8 Claims**



1. A corrosion resistant microminiature circuit structure comprising:

a substrate having a conductive electrode pattern with a plurality of connecting areas which are wettable by solder;

said conductive electrode is composed predominently of silver and a lesser quantity of platinum group metal;

regions surrounding said connecting areas not wettable by solder;

at least a portion of said regions surrounding including a gold bearing, glasseous layer over a portion of a said conductive electrode including a silver and gold alloy;

a chip of semiconductor material having a planar face with solder wettable terminal areas; and

solder contacts establishing a unified joint between the

terminal areas of said chip and said connecting areas, said solder contacts forming the means for physically supporting said chip from said substrate.

4,017,890

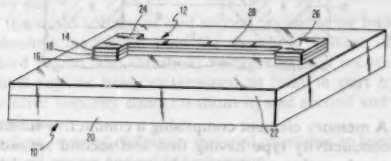
INTERMETALLIC COMPOUND LAYER IN THIN FILMS FOR IMPROVED ELECTROMIGRATION RESISTANCE

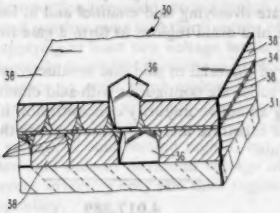
James Kent Howard, Fishkill, and Paul Siu-Chung Ho, Mahopac, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Oct. 24, 1975, Ser. No. 625,439

Int. Cl.² H01L *23/48, 29/46, 29/62, 29/64*

U.S. Cl. 357—67 **17 Claims**





1. A current conductive stripe having minimum physical dimensions and being supported upon a substrate comprising: aluminum and at least one region within the aluminum stripe containing an intermetallic compound of aluminum and a transition metal.

4,017,891

METHOD AND EQUIPMENT FOR LINE-BY-LINE RECORDING OF COLOR COMPONENT IMAGES ON A REPRODUCTION CARRIER

Josef Helmberger, Munich, and Klaus Stadler, Irschenhausen, both of Germany, assignors to AGFA-Gevaert, A.G., Leverkusen, Germany

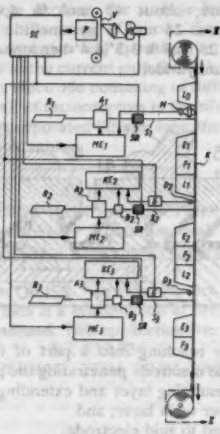
Filed Sept. 10, 1975, Ser. No. 611,976

Claims priority, application Germany, Sept. 11, 1974, 2443378

Int. Cl.² H04N *5/84, 5/76*

U.S. Cl. 358—6 **24 Claims**

1. In a method for line-by-line recording of color component images on a reproduction carrier by means of a controlled beam wherein recording of a first color component image takes place at a first recording station and recording of a second color component image takes place at a second recording station separated from said first recording station by at least one further processing station, the improvement comprising the steps of creating a mark on said reproduction carrier indicative of the position of said first color component image; sensing said mark at said second recording station and creating a position signal corresponding to the position of said mark relative to a determined position; and fine positioning the raster of said beam at said second recording station in accordance with said position signal, whereby said second



color component image is superimposed in registry upon said first color component image.

4,017,892

VIDEO INFORMATION REPRODUCTION CIRCUITRY HAVING DROP-OUT COMPENSATION CIRCUIT

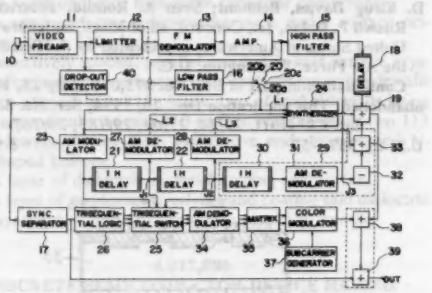
Ichiro Takahara, Kadoma; Yoshiharu Toyoshima, Katano, and Yuzo Yamamoto, Hirakata, all of Japan, assignors to Sanyo Electric Co., Ltd., Osaka, Japan

Filed Mar. 5, 1976, Ser. No. 664,388

Claims priority, application Japan, Mar. 5, 1975, 50-27466

Int. Cl.² H04N *5/76*

U.S. Cl. 358—8 **3 Claims**



1. In a video information reproduction circuitry for use in a video disc player of a type utilizing a combination of a flexible foil-type video disc having at least one surface formed with a spirally extending information-carrier groove and a transducer adapted to be slidingly engaged in said information-carrier groove on said video disc during reproduction of video information, said reproduction circuitry comprising means for detecting at least frequency-modulated video information being picked up by said transducer, said frequency-modulated video information including a luminance signal and a trisequential color signal superimposed sequentially and in line-by-line fashion upon low-frequency components of said luminance signal; means for separating said frequency-modulated video information into high and low components of said luminance signal; first and second delay circuits connected in series with each other; means coupled to said separating means, said first delay circuit and said second delay circuit for

simultaneously receiving different color components included in said trisequential color signal and generating a synthesized output signal; means for summing the low and high frequency components of the luminance signal to give a complete luminance signal; a trisequential switching circuit coupled to receive said different color components included in said trisequential color signal simultaneously and for generating color difference signals; means for preparing a chrominance signal upon receipt of said color difference signal; means for preparing a composite video signal by the summation of said chrominance signal and said complete luminance signal, which composite video signal being adapted to be reproduced by a television receiver; and a vertical resolution compensating circuit including a third delay line coupled to said second delay line for delaying one line period the trisequential color signal which has been delayed one line period by said first delay circuit and another one line period by said second delay circuit, thereby providing color components outputted in the same sequence as that of the color components emerging from said separating means, and means for applying a difference signal to said simultaneously receiving means, said difference signal being indicative of the difference in level between said trisequential color signal of one cycle and that of the next succeeding cycle, the improvement which comprises a drop-out compensation circuit including means for detecting the presence of a drop-out in said video information being picked up by said transducer, said detecting means generating a trigger signal of a duration substantially equal to a drop-out period in response to the presence of said drop-out in said video information, and a switching means for interrupting the passage between said separating means and said simultaneously receiving means and first delay circuit and, at the same time, completing a loop from said third delay line back to said first delay circuit, in response to and during the duration of said trigger signal for applying one portion of the color components of the trisequential color signal, which has been omitted by the drop-out in the video information, to said simultaneously receiving means and also to said switching means.

4,017,893
DISPLAY DEVICE FOR PRODUCING POLYCHROMATIC LUMINOUS IMAGES

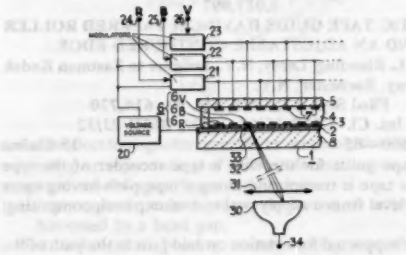
Georges Broussaud, Paris, France, assignor to Thomson-CSF, Paris, France

Filed Sept. 9, 1975, Ser. No. 611,837

Claims priority, application France, Sept. 13, 1974, 74.31150

Int. Cl.² H04N *9/12, 5/70*

U.S. Cl. 358—59 **8 Claims**



1. A display device for producing a polychromatic luminous image, externally controlled by both electrical signals and an invisible scanning radiating beam, comprising:

a display panel comprising two main faces facing each other and forming a gas-tight enclosure for retaining an ionizable gas, at least one of said faces being transparent to said radiating beam which beam has a wave length lower than the wave length of visible radiation;

electrical means comprising a first group of electrodes and a second group of electrodes respectively located on said two main faces, which when facing each other determine elementary zones of ionization in said gas-tight enclosure, said two groups of electrodes being adapted for receiving a supply voltage;

photoconductive elements placed in said elementary zones between said two groups of electrodes, responsive to said invisible scanning radiating beam, which scans said transparent main face for enabling local ionization of said zones; and

several groups of luminescent elements arranged in said elementary zones, responsive to the charges produced by said ionization and adapted for respectively emitting primary radiations and forming by addition the synthesis of said image, said electrical signals modulating said primary radiations.

4,017,894
METHOD FOR PREPARING COLOR SEPARATION PRINTING PATTERNS

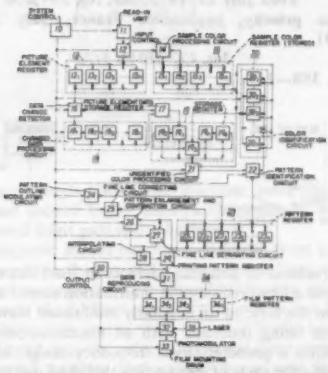
Hitoshi Akami, Yokohama; Shigeru Nishikawa, Aikawa; Toshio Ikeda, Kyoto, and Akira Tsukokura, Joyo, all of Japan, assignors to Agency of Industrial Science & Technology, Tokyo and Daido-Maruta Finishing Co., Ltd., both of, Japan

Filed Sept. 26, 1974, Ser. No. 509,499

Claims priority, application Japan, Oct. 1, 1973, 48-110764; Jan. 28, 1974, 49-11590

Int. Cl.² H04N *1/46*

U.S. Cl. 358—80 **9 Claims**



1. In a method for preparing color separation printing pattern films suitable for use in an additive color printing process by irradiating a multi-colored original design with light; scanning the original design to detect optical energy levels of reflected red, blue and green components of quantized picture elements in said design; generating picture element data representative of the red, green and blue components thereof; and using said data to control the formation of a black and white pattern on a photosensitive film corresponding to a primary color content in said original design, the improvement which comprises:

a. sequentially comparing picture element data to determine the existence of a predetermined differential in optical energy levels therebetween;

b. recording standard picture element data not exceeding said differential as a single data group coded with the number of said picture elements and the representative optical energy level thereof;

c. comparing non-standard picture element data exceeding said differential with a series of pre-recorded picture element data groups characteristic of changes in said

original design due to unevenly applied color, fidelity of the system, irregular original surfaces, overlapped colors and color boundaries;

d. recording a non-standard picture element data pattern as a single data group coded with the number of said picture elements and a change identification code representative of a corresponding pre-recorded picture element data pattern;

e. comparing said standard single data groups with sample color data to identify the color thereof and encoding a color identification therewith;

f. interpolating non-standard picture element data groups into preceding and succeeding standard picture element data groups with a predetermined interpolation coefficient based on said change identification code; and

g. using the resultant modified picture element data to modulate the irradiation and non-irradiation of a laser beam on said photosensitive film to form said black and white pattern thereon.

4,017,895

METHOD OF DETECTING DEFECTS IN READ OUT SIGNALS, AND APPARATUS FOR IMPLEMENTING THE SAME

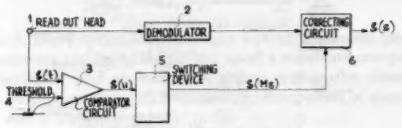
Pierre Oprandi, and René Romeas, both of Paris, France, assignors to Thomson-Brandt, Paris, France

Filed July 21, 1975, Ser. No. 597,634

Claims priority, application France, July 23, 1974, 74.25491

Int. Cl.² H04N *5/76*

U.S. Cl. 358—127 **9 Claims**



1. A method of detecting defects in read-out signals supplied from a head reading the information stored upon a data carrier in the form of an angularly modulated waveform, said waveform being recorded with an instantaneous frequency lying within a predetermined frequency range; said method comprising the steps of: converting said read-out signals into a square-wave waveform having two levels; demodulating said square-wave waveform; deriving from said square-wave waveform trigger pulses supplied each time a transition occurs from the first to the second of said levels; triggering with said trigger pulses a monostable switching circuit having a predetermined relaxation duration; said relaxation duration being selected outside a range of values which are the reciprocals of the frequency values of said predetermined frequency range; and controlling a defect correcting circuit receiving said read-out signals demodulated with the switching signal arising from the switching of said monostable switching circuit.

7. A system for detecting defects undergone by read-out signals supplied from a head reading the information stored upon a data carrier in the form of an angularly modulated waveform, said waveform being recorded with an instantaneous frequency lying within a predetermined frequency range; said system comprising: means for converting said read-out signals into a two level square-wave waveform; means for deriving from said two level square-wave waveform trigger pulses supplied each time a transition occurs between the first and the second of said levels; and, monostable switching means triggered with said trigger pulses.

4,017,896

REVERSING CASSETTE TAPE MACHINE

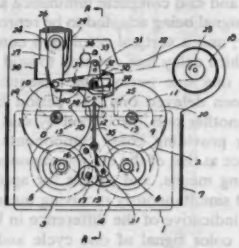
Shigeji Takemoto, 8-7, Gakuen Asahimachi, Nara, Japan

Filed June 17, 1975, Ser. No. 587,614

Claims priority, application Japan, July 19, 1974, 49-83394; July 19, 1974, 49-83395; July 19, 1974, 49-83396; July 19, 1974, 49-83397; July 19, 1974, 49-83398

Int. Cl.² G11B *15/06, 15/29, 23/04*

U.S. Cl. 360—74 **7 Claims**



1. A tape cassette recorder comprising a pair of reel shafts which accommodate both winding and rewinding shafts contained within a tape cassette, a pair of capstan shafts to be rotated in opposite directions for transferring magnetic tape in said cassette alternatively in opposite directions, each of said capstan shafts including a flywheel and at least one of said flywheels being provided with a projecting pin, an idle roller including mounting means for shifting the idle roller between two positions and for alternatively rotating each of said reel shafts in opposite directions, a driving motor including belt means for rotating said flywheels, capstans and idle roller, a sensor which senses the end of a magnetic tape and electromagnetic relay including a contact plate which is shifted by said electromagnetic relay in response to said sensor to a position to be engaged by said pin for movement by said pin to another position, and means connecting said contact plate with said mounting means for the idle roller for shifting the idle roller alternatively between said two positions in response to movement of said contact plate to said another position.

4,017,897

MAGNETIC TAPE GUIDE HAVING A TAPERED ROLLER AND AN ADJUSTABLE CONTOURED EDGE

Douglass L. Blanding, Leroy, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Sept. 17, 1975, Ser. No. 614,720

Int. Cl.² G11B *15/60, 23/04;* **B65H** *23/32*

U.S. Cl. 360—85 **15 Claims**

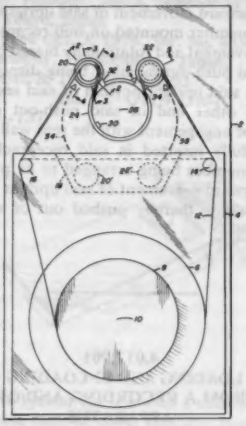
1. A tape guide for use with a tape recorder of the type wherein a tape is transported along a tape path having more than one level from a supply reel to a takeup reel, comprising:

a post;

a roller supported for rotation on said post in the path of the tape, said roller having a tapered guiding surface for guidedly inclining the tape from a first tape path level to a second tape path level, the tape further entering and exiting said tapered guidng surfaces at predetermined points. thereon and defining a curved tape path therebetween; and

means arcuately disposed along a portion of the edge of said curved tape path, and adapted to be fixedly secured relative to said roller, for completely guiding an edge of the tape along the arcuate length of said means from said

first tape path level to said second tape path level, said means extending radially outward from said post and



adjacent one end of said roller for cooperaton with said tapered guiding surface.

4,017,898

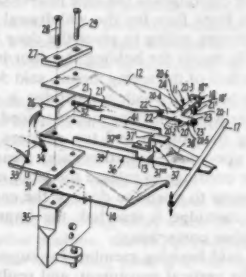
METHOD AND AP... US FOR RECORDING AND REPRODUC... VIDEO SIGNALS

Harold G. Toombs, Sunnyvale, and Royce R. Sullivan, San Jose, both of Calif., assignors to Redlake Corporation, Santa Clara, Calif.

Continuation of Ser. No. 513,996, Oct. 11, 1974, abandoned, which is a continuation-in-part of Ser. No. 315,336, Dec. 15, 1972, abandoned. This application Apr. 28, 1976, Ser. No. 681,347

Int. Cl.² G11B *21/22, 5/54, 5/48*

U.S. Cl. 360—105 **12 Claims**



1. An electromagnetic transducer assembly for the contact recording or reproducing of video information on a moving magnetic recording surface, comprising:

electromagnetic transducer means having an active surface traversed by a head gap;

first and second bearing means having smooth bearing surfaces;

an open frame for maintaining said transducer means and said bearing means in such juxtaposition that said active surface and said smooth bearing surfaces can simultaneously contact said magnetic recording surface, said frame consisting of a first elongated member to a first end of which said transducer means is affixed, a second elongated member to a first end of which said first bearing means is affixed, and a third elongated member to a first end of which said second bearing means is affixed, said elongated members being united at their ends remote from said first ends and being unprovided with rigidifying means;

first cantilever spring means for resiliently supporting said frame, transducer means, and bearing means near said moving magnetic recording surface but not in contact therewith and for maintaining the position of said frame against the urging of forces arising from contact between said transducer means and bearing means and said moving magnetic recording surface, said frame being attached to the free end of said first cantilever spring means; and

second cantilever spring means resiliently urging said frame toward said moving magnetic recording surface and thus maintaining said transducer means and said bearing means in contact with said moving magnetic recording surface during the recording and reproducing of video information thereon.

4,017,899

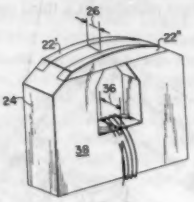
SINGLE-TRACK VIDEO FERRITE RECORD/REPRODUCE HEAD AND MANUFACTURING METHOD THEREFOR

John F. Bagby, Encinitas, Calif., assignor to Spin Physics, Inc., San Diego, Calif.

Continuation-in-part of Ser. No. 519,358, Oct. 29, 1974, abandoned. This application Mar. 22, 1976, Ser. No. 668,873

Int. Cl.² G11B *5/221*

U.S. Cl. 360—122 **3 Claims**



1. A narrow, single-track video magnetic head comprising:

a. first and second ferrite parts, each having an arcuately contoured front part and a back part;

b. non-magnetic means bonding said ferrite front and back parts together, thereby to form transducer front and back gaps between said ferrite front and back parts, said ferrite front parts at said front gap being 10 mils or less in width and substantially less in width than said ferrite back parts at said back gap, the side walls of said front part having ferrite wall portions that extend across said front gap substantially parallel to each other on both sides of said front gap; and

c. separate ceramic pieces, mounted in parallel and glass-bonded to both said ferrite wall portions at both sides of said front gap, for protecting said gap from deteriorating, said ceramic having slightly less wear resistance than said ferrite such that said ceramic wears slightly faster than said ferrite first and second parts.

4,017,900

TAPE RECORDER CASSETTE EJECTING DEVICE

Hiromasa Katsurayana, Nagoya, Japan, assignor to Shin-Shirasuna Electric Corporation, Nagoya, Japan

Filed July 22, 1975, Ser. No. 597,997

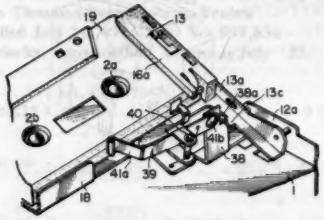
Int. Cl.² G11B *23/04*

U.S. Cl. 360—137 **2 Claims**

1. In a cassette tape recorder having a chassis, a pair of reel spindles for removably mounting thereon a magnetic tape cassette, drive means for rotating said reel spindles, a plurality of depressible operable keys, including at least playback key and an eject key, which are arranged in a row along one side

of said recorder, magnetic head means adapted to be brought into engagement with a magnetic tape in said cassette by depressing said playback key, means for locking said playback key in the depressed position, and cassette receptacle means mounted for pivotal movement between a position inclined through a predetermined angle with respect to said chassis where said cassette can be inserted into or removed from said cassette receptacle means and a position substantially parallel with respect to said chassis, the improvement comprising a cassette eject mechanism which comprises, in combination:

resiliently operable actuator means comprising a first slide member slidable along a surface of said chassis and normally biased toward said eject key by means of a spring, said first slide member being arranged to be slid forwardly of said eject key against said spring by depressing said eject key, an engaging piece provided on said first slide member, a connector member having a pair of first and second arms extending substantially perpendicularly with respect to each other and a base portion through which said first and second arms are integrally connected with each other, said connector member being rotatably attached at a first position to an upright bracket provided on said chassis, said first position being in or adjacent to said base portion, said connector member being also movably coupled at a second position to said cassette receptacle means, said second position being adjacent to the free end of said first arm, the free end of said second arm being adapted to be engaged by said engaging piece, and a toggle spring means having one end thereof coupled to said connector member at a third position adjacent to



the end of said base portion, said first position being between said second position and said third position but closer to said third position, the other end of said spring being coupled to said cassette receptacle means, wherein when said cassette receptacle means is in said parallel position, said connector member is positioned so that said first and second arms thereof are respectively substantially parallel and perpendicular to said chassis while said spring means is compressed wherein said connector member and said cassette receptacle means are maintained in said positions respectively, and wherein when said eject key is depressed, said second arm is pushed by said engaging piece so that said connector member is rotated in one direction against the action of said spring means and at the same time said toggle spring means is rotated in the opposite direction while being expanded, as a result of which said cassette receptacle means is moved from said parallel position to said inclined position; and

cassette push-out means comprising a second slide member provided with an upright portion at the front end thereof, said second slide member being disposed in overlapping relationship with said first slide member and connected thereto through a spring so as to be slidable therewith, a stepped portion formed in said upright portion at one end thereof, an inwardly directed projection means provided on said cassette receptacle means, said inwardly directed projection means being arranged to be positioned at a lower level than said stepped portion when said receptacle means is in said parallel position and to be moved up to a higher level than said stepped portion at the time when said receptacle means has substantially been moved from said parallel position to said inclined position through the depression of said eject key, thereby permitting of a forward movement of said upright portion, and a push-out member mounted on said receptacle means for pivotal movement and rotationally biased by a spring, one end of said push-out member being disposed in engagement with said upright portion of said second operating lever, the other end of said push-out member being adapted for engagement with the rear wall of the cassette which is fully inserted in said receptacle means, said push-out member being arranged to be pivotally moved by said forward movement of said upright portion so that said cassette is thereby pushed out of said receptacle means.

4,017,901

DEVICE FOR LOADING AND UNLOADING CARTRIDGES INTO AND FROM A RECORDING AND/OR PLAYBACK APPARATUS

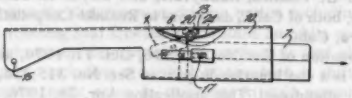
Theophiel Clement Jozef Lodewijk Staar, Kraainem, Belgium, assignor to Staar, S.A., Brussels, Belgium

Filed July 29, 1975, Ser. No. 600,090

Claims priority, application France, July 30, 1974, 74.26452

Int. Cl.² G11B *23/08*

U.S. Cl. 360—137 **4 Claims**



1. In a device for loading and unloading cartridges into and from a recording and/or playback apparatus for magnetic tapes stored in cartridges of the type provided with a pivotable door on their front face for the withdrawal of the magnetic tape, spring means acting to pivot the door to its open position, and latch means for holding the door in closed position against the action of the spring means, said device including a housing member into which a cartridge is slidably inserted having a lower wall and roller means spaced above the lower wall engaging the bottom and top surfaces of the cartridge respectively upon such insertion, and means coacting with means on the cartridge to release the latch means and enable the spring means to open the door of the cartridge automatically as the cartridge is inserted; the improvement in said housing member comprising:

means on said housing member for supporting said roller means for vertical movement; and resilient means

a. biasing said roller means downwardly to a normal position below the plane on the top surface of the cartridge to engage the front of the door of the cartridge when the cartridge is inserted, front face forward, while allowing the roller means to raise and ride along the top surface of the cartridge,

b. including an element connected to said roller means, located in the path of an inserted cartridge, and extending longitudinally of said path to be engaged by the opened door of a cartridge for cooperative raising of the roller means and lowering of the door to clear the door and cartridge and allow insertion of a cartridge with its door open, and

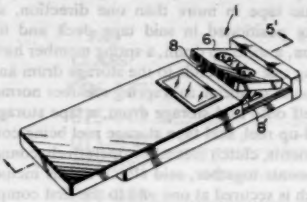
c. acting to bias said roller means downwardly to engage and forcefully pivot the door of the cartridge to its closed position automatically as the latter is slidably removed from the housing member.

4,017,902

CASSETTE EJECTOR FOR TAPE RECORDER

Masaaki Sato, Hachioji, Japan, assignor to Olympus Optical Co., Ltd., Tokyo, Japan

Filed Oct. 3, 1975, Ser. No. 619,252
Claims priority, application Japan, Oct. 8, 1974, 49-115902; Oct. 8, 1974, 49-115903
Int. Cl.² G11B 23/04
U.S. Cl. 360—137 5 Claims



1. A cassette ejector for use with a cassette tape recorder having a slidable cassette cover movable from a closed to an open position, comprising:

a sliding plate which carries at least one member associated with a recording or play back operation of the tape recorder, the sliding plate being movable from an operative position wherein the at least one member associated with a recording or play back operation is in operative contact with the cassette to an inoperative position wherein the at least one member associated with a recording or play back operation is out of operative contact with the cassette, the sliding plate being movable into the operative position when the slidable cassette cover is moved into the closed position and movable into the inoperative position when the slidable cassette cover is moved into the open position;

an actuating roller mounted on the slidable cassette cover for movement with the slidable cassette cover;

an operating pawl and an eject lever pivotally mounted on the sliding plate about a single axis, the operating pawl being movable from a first position wherein the operating pawl is positioned in the path of movement of the activating roller to a second position wherein the operating pawl is removed from the path of movement of the activating roller;

means for causing the eject lever to rotate with the operating pawl and to cause an ejecting operation of the cassette when the operating pawl is engaged by the actuating roller when the slidable cassette cover is being moved from the closed to the open position;

means for removing the operating pawl from the path of movement of the actuating roller when the sliding plate is in the operative position, thereby preventing an ejecting operating when the sliding plate is in the operative position.

4,017,903

PULSE CODE MODULATION RECORDING AND/OR REPRODUCING SYSTEM

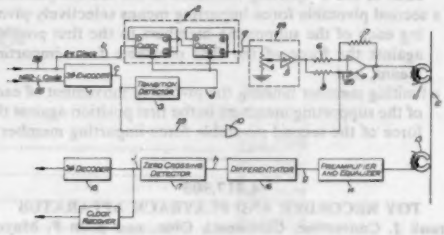
Peter F. Chu, Poway, Calif., assignor to Hewlett-Packard Company, Palo Alto, Calif.

Filed Aug. 27, 1975, Ser. No. 608,139
Int. Cl.² G11B 5/09
U.S. Cl. 360—40 10 Claims

1. A method for recording on magnetic tape encoded digital data, the method comprising the steps of:

generating a unipolar digital signal having transitions between a first state and a second state in response to said digital data, said unipolar digital signal representing said data through the use of preselected delay periods between said transitions and having no more than one transition for each bit represented;

generating a bipolar digital signal in response to said unipolar digital signal by alternately producing a positive pulse, then a negative pulse, said pulses being of approximately equal duration and being spaced at intervals approximately equal to the delay periods between the transitions



between said first and second states of said unipolar digital signal:

holding said bipolar signal at an intermediate potential when not producing said positive and negative pulses; and

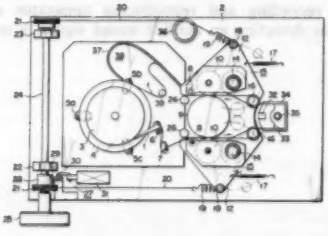
producing magnetic impressions on said magnetic tape in response to said bipolar digital signal.

4,017,904

TAPE DRIVING DEVICE INCLUDING PINCH ROLLER AND TAPE GUIDE MOUNTING MEANS

Hiroyuki Tsukamoto, Kawasaki; Morio Akino, Fujisawa; Satoshi Hara, Naka, all of Japan; Kazuyoshi Kikuchi, deceased, late of Kawasaki, Japan; Yumiko Kon, representative, and Jun Kon, representative, both of Sagamihara, Japan, assignors to Tokyo Shibaura Electric Co., Ltd., Kawasaki, Japan

Filed Sept. 11, 1975, Ser. No. 612,556
Claims priority, application Japan, Sept. 14, 1974, 49-106495
Int. Cl.² G11B 15/29, 15/60; B65H 17/22; G03B 1/56
U.S. Cl. 360—90 9 Claims



1. A tape driving device comprising:

a base,

a capstan rotatably mounted on said base,

a stationary magnetic head provided near the capstan,

a pair of supporting members pivotably disposed on opposite sides of the capstan,

a pinch roller having an elastic peripheral surface and rotatably supported near the capstan on each one of the supporting members,

a head facing tape guide supported near the magnetic head on each one of the supporting members,

means mounting each of said supporting member on said base for pivotal movement between a first position in which the pinch roller thereof and tape guide thereof press a magnetic tape against the capstan and the magnetic head, respectively, so as to facilitate the drive of said tape by said pinch rollers and said capstan and the recording and reproduction of material upon said tape by said magnetic head, and a second position in which the

pinch roller and the tape guide are spaced apart from the capstan and the magnetic head, respectively so as to facilitate the loading or removal of said tape with respect to said pinch rollers, said capstan, and said magnetic head,

a first pivotable force-imparting means normally pivoting each of the supporting members to the second position,

a second pivotable force-imparting means selectively pivoting each of the supporting members to the first position against the force of the first pivotable force-imparting means, and

a limiting member limiting the pivotable movement of each of the supporting members in the first position against the force of the second pivotable force-imparting member.

4,017,905

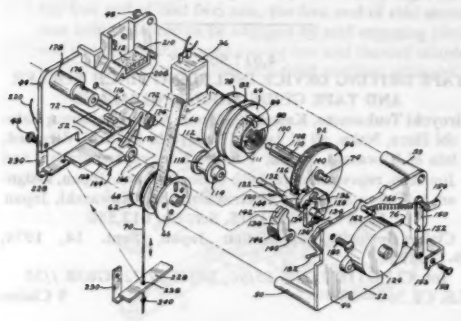
TOY RECORDER AND PLAYBACK APPARATUS

Frank J. Convertine, Cincinnati, Ohio, and John F. Mayer, Fort Thomas, Ky., assignors to General Mills Fun Group, Inc., Minneapolis, Minn.

Continuation-in-part of Ser. No. 243,165, April 12, 1972, abandoned. This application Oct. 19, 1973, Ser. No. 408,231

Int. Cl.[2] G11B *15/10, 15/18, 5/12, 15/12*

U.S. Cl. 360—96 **11 Claims**



1. A recording and reproducing apparatus comprising means for detecting an audible sound signal, a movable recording medium comprising a magnetic tape having first and second ends, sound recording means for magnetically recording the audible sound signal detected by said detecting means, means for operatively connecting said recording means and said sound detecting means together, sound reproducing means for magnetically reproducing the signals from said movable recording medium, a tape deck, means including a constant force spring motor for imparting movement to said magnetic tape, said means permitting relative movement of the magnetic tape in more than one direction, said spring motor being positioned in said tape deck and including a storage drum, a wind-up drum, a spring member having means for attaching one of its ends to the storage drum and its other end to the wind-up drum, said spring member normally biased to wind itself onto said storage drum, a tape storage reel and a tape wind-up reel, said tape storage reel being comprised of two components, clutch means for operatively connecting said two components together, said clutch means including a coil spring which is secured at one end to the first component and which surrounds a hub forming a part of the second component, said coil spring adapted to grip said hub as said first component rotates in one direction, means for connecting said first component to the spring wind-up drum, said first component being rotatable in either direction, said clutch means permitting the second component to rotate in only a single direction, means for securing a first end of said tape to said storage reel and a second end of said tape to said wind-up reel, said tape storage reel and said spring wind-up reel being operatively connected together, governor means for controlling the rate of travel of said magnetic tape, amplifier means for amplifying the sound signal detected by said detecting means and the sound reproduced by said sound reproducing means, manually operable switch means for controlling the recording and reproducing of sound signals on said magnetic tape, means for erasing the recording signal on said magnetic tape, said erasing means comprising a magnet and a movable member for supporting said magnet proximate the magnetic tape, means for actuating said switch means between recording and reproducing positions, and means for actuating said erasing means into an erase position at substantially the same time that the switch means is actuated to said recording position, and a non-erase position at substantially the same time that the switch means is actuated to said reproducing position.

DESIGN PATENTS

GRANTED APRIL 12, 1977

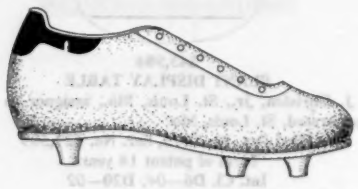
ERRATA

For CLASS	See PATENT NO.
006–187	224,019
013–013	244,026
013–030	244,027
014–043	244,034
014–065	244,035
014–052	244,036
014–036	244,037
014–086	244,038
014–086	244,039
014–086	244,040
014–080	244,052
014–002	244,053
016–006	244,054
016–006	244,055
024–062	244,057
024–064	244,058
010–104	244,059

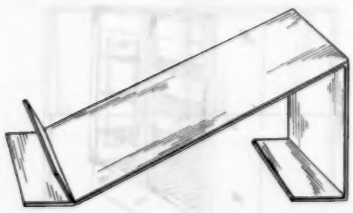
DESIGNS

APRIL 12, 1977

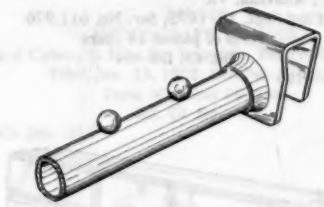
243,976
ATHLETIC SHOE OR THE LIKE
Horst Rudolf Dassler, Eckartswiller, France, assignor to Fabriques de Chaussures de Sport S.A.R.L., Dettwiller, France
Filed Aug. 13, 1975, Ser. No. 604,217
Term of patent 14 years
Int. Cl. D2—*04*
U.S. Cl. D2—311



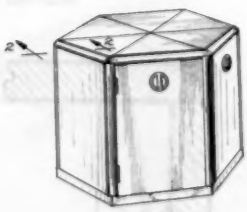
243,977
COMPUTER STAND
John E. Roberts, 2198 Garden Drive, Wickliffe, Ohio 44092
Filed July 7, 1975, Ser. No. 593,886
Term of patent 14 years
Int. Cl. D6—*99*
U.S. Cl. D6—85



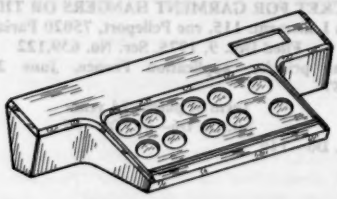
243,978
BRACKET FOR GARMENT HANGERS OR THE LIKE
Georges Lallement, 115, rue Pelleport, 75020 Paris, France
Filed Dec. 9, 1975, Ser. No. 639,122
Claims priority, application France, June 20, 1975, 75.73957
Term of patent 14 years
Int. Cl. D6—*04*; D8—*08*
U.S. Cl. D6—116



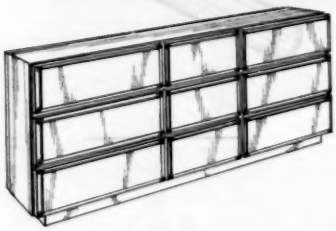
243,979
HEXAGONAL COMMODE
Roland P. Carter, Lynchburg, Va., assignor to The Lane Company, Inc., Altavista, Va.
Filed Sept. 10, 1975, Ser. No. 611,966
Term of patent 7 years
Int. Cl. D6—*06*
U.S. Cl. D6—146



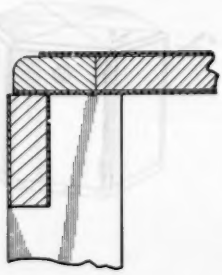
243,980
COMBINED DISPLAY AND DEMONSTRATION UNIT FOR LENSES OR THE LIKE
Joseph A. A. Mankowski, Corning, N.Y., assignor to Corning Glass Works
Filed Nov. 14, 1975, Ser. No. 632,138
Term of patent 14 years
Int. Cl. D20—*02*; D6—*04*
U.S. Cl. D6—157



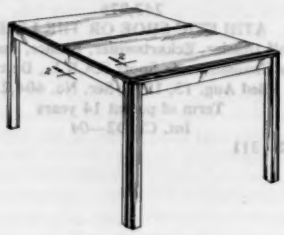
243,981
DRESSER
Roland P. Carter, Lynchburg, Va., assignor to The Lane Company, Inc., Altavista, Va.
Filed Sept. 10, 1975, Ser. No. 611,970
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—166



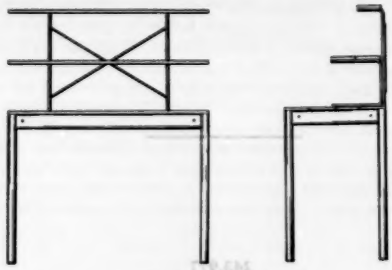
243,982
COCKTAIL TABLE
Roland P. Carter, Lynchburg, Va., assignor to The Lane Company, Inc., Altavista, Va.
Filed Sept. 10, 1975, Ser. No. 611,965
Term of patent 7 years
Int. Cl. D6—*03*
U.S. Cl. D6—177



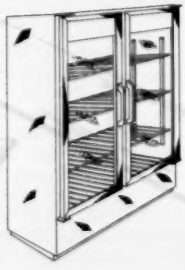
243,983
TABLE
Roland P. Carter, Lynchburg, Va., assignor to The Lane Company, Inc., Altavista, Va.
Filed Sept. 10, 1975, Ser. No. 611,969
Term of patent 7 years
Int. Cl. D6—*03*
U.S. Cl. D6—177



243,984
PLANT DISPLAY TABLE
Louis J. Christen, Jr., St. Louis, Mo., assignor to Christen Incorporated, St. Louis, Mo.
Filed Oct. 31, 1975, Ser. No. 627,509
Term of patent 14 years
Int. Cl. D6—*04*; D20—*02*
U.S. Cl. D6—179

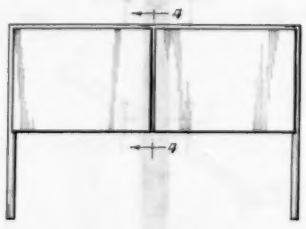


243,985
REFRIGERATED DISPLAY CASE
Robert I. Brown, 2519 Wendell Ave., Lima, Ohio 45802
Filed Dec. 17, 1973, Ser. No. 425,271
Term of patent 14 years
Int. Cl. D6—*04*; D15—*07*
U.S. Cl. D6—187

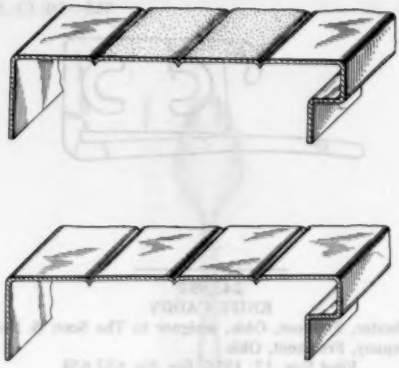


243,986
BASE SUPPORT
Daniel W. O'Leary, Jr., 4119 Verner Drive, Murrysville, Pa. 15668
Filed June 2, 1975, Ser. No. 582,846
Term of patent 14 years
Int. Cl. D6—*06*
U.S. Cl. D6—194

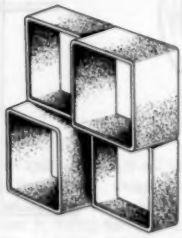
243,987
BED HEADBOARD
Roland P. Carter, Lynchburg, Va., assignor to The Lane Company, Inc., Altavista, Va.
Filed Sept. 10, 1975, Ser. No. 611,964
Term of patent 7 years
Int. Cl. D6—*06*
U.S. Cl. D6—198



243,988
FRAME MOLDING
Greg Copeland, 114 Beach Terrace, Wayne, N.J. 07470
Filed July 17, 1975, Ser. No. 596,887
Term of patent 14 years
Int. Cl. D6—*07*
U.S. Cl. D6—232



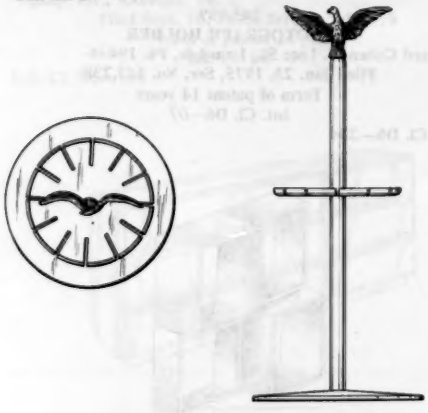
243,989
PHOTOGRAPH HOLDER
Bernard Cohen, S. Line St., Lansdale, Pa. 19446
Filed Jan. 23, 1975, Ser. No. 543,238
Term of patent 14 years
Int. Cl. D6—*07*
U.S. Cl. D6—234



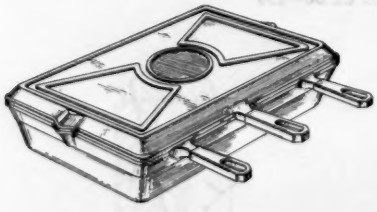
243,990
PICTURE FRAME AND EASEL
Cole Williams, 2408 Allanjay Place, Glendale, Calif. 91208
Filed Jan. 16, 1975, Ser. No. 541,607
Term of patent 14 years
Int. Cl. D6—*07*
U.S. Cl. D6—236

243,991
DISPLAY HANGER
Joseph D. Schmidt, Jr., 1909 Lincoln Ave., Chicago, Ill. 60614
Filed July 9, 1975, Ser. No. 594,441
Term of patent 14 years
Int. Cl. D6—*08*
U.S. Cl. D6—247

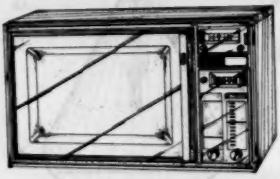
243,992
KNIFE CADDY
Earl Baxter, Fremont, Ohio, assignor to The Scott & Fetzer Company, Freemont, Ohio
Filed Nov. 17, 1975, Ser. No. 632,638
Term of patent 14 years
Int. Cl. D7—*06*
U.S. Cl. D7—74



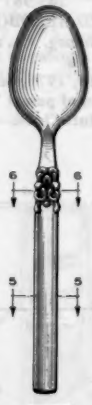
243,993
COOKWARE UNIT
Lorence O'Russa, 314 Lincoln, Metamora, Ill. 61548, and Richard L. O'Russa, 5121 No. Isabell, Peoria, Ill. 61614
Filed July 31, 1975, Ser. No. 600,795
Term of patent 14 years
Int. Cl. D7—*02*
U.S. Cl. D7—95



243,994
MICROWAVE OVEN
Yoshiaki Kawata, Nara; Daisaku Mori, Yamato-koriyama, and Masamichi Yamamura, Osaka, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan
Filed Mar. 25, 1976, Ser. No. 670,566
Claims priority, application Japan, Sept. 29, 1975, 50-39508
Term of patent 14 years
Int. Cl. D7—*04*
U.S. Cl. D7—128



243,995
SPOON OR SIMILAR ARTICLE
Z. George Zephries, Roselle, Ill., assignor to American Home Products Corporation, New York, N.Y.
Filed Nov. 7, 1975, Ser. No. 629,999
Term of patent 14 years
Int. Cl. D7—*03*
U.S. Cl. D7—137



243,996
SPOON OR SIMILAR ARTICLE
Z. George Zephries, Roselle, Ill., assignor to American Home Products Corporation, New York, N.Y.
Filed Nov. 7, 1975, Ser. No. 630,000
Term of patent 14 years
Int. Cl. D7—*03*
U.S. Cl. D7—137

243,997
SPOON OR SIMILAR ARTICLE
Z. George Zephries, Roselle, Ill., assignor to American Home Products Corporation, New York, N.Y.
Filed Nov. 7, 1975, Ser. No. 630,001
Term of patent 14 years
Int. Cl. D7—*03*
U.S. Cl. D7—137

243,998
SPOON OR SIMILAR ARTICLE
Z. George Zephries, Roselle, Ill., assignor to American Home Products Corporation, New York, N.Y.
Filed Nov. 7, 1975, Ser. No. 630,003
Term of patent 14 years
Int. Cl. D7—*03*
U.S. Cl. D7—137

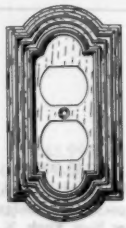
243,999
SPOON OR SIMILAR ARTICLE
Z. George Zephries, Roselle, Ill., assignor to American Home Products Corporation, New York, N.Y.
Filed Nov. 7, 1975, Ser. No. 630,004
Term of patent 14 years
Int. Cl. D7—*03*
U.S. Cl. D7—137

244,000
SPOON OR SIMILAR ARTICLE
Z. George Zephries, Roselle, Ill., assignor to American Home Products Corporation, New York, N.Y.
Filed Nov. 7, 1975, Ser. No. 630,005
Term of patent 14 years
Int. Cl. D7—*03*
U.S. Cl. D7—137

244,001
SPOON OR SIMILAR ARTICLE
Z. George Zephries, Roselle, Ill., assignor to American Home Products Corporation, New York, N.Y.
Filed Nov. 7, 1975, Ser. No. 629,994
Term of patent 14 years
Int. Cl. D7—*03*
U.S. Cl. D7—151

244,002
CORK RETRIEVER
Bernard R. Bonin, 7 Linden Ave., Westbrook, Conn. 06498
Filed Oct. 24, 1975, Ser. No. 625,371
Term of patent 14 years
Int. Cl. D7—*06*
U.S. Cl. D8—42

244,003
WALL PLATE-CONCENTRIC MARGIN
Joan Grieb, Westfield, N.J., assignor to General Electric Company
Filed Oct. 20, 1975, Ser. No. 624,088
Term of patent 14 years
Int. Cl. D8—*09*
U.S. Cl. D8—350

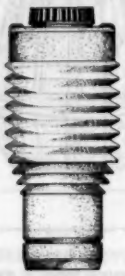


244,004
DOUBLE ACTING DOOR LIFT AND CLOSING DEVICE
Glenn V. Searer, Elkhart, Ind., assignor to Elkhart Rivet & Register Co., Inc., Elkhart, Ind.
Filed Nov. 13, 1975, Ser. No. 631,709
Term of patent 14 years
Int. Cl. D8—*09*
U.S. Cl. D8—330

244,005
UTILITY POLE TOP INSULATOR BRACKET
Joseph W. Dimiceli, San Rafael, and Edgardo R. Labra, Corte Madera, both of Calif., assignors to Utilities Hardware, Inc., Richmond, Calif.
Filed Apr. 5, 1976, Ser. No. 673,650
Term of patent 14 years
Int. Cl. D8—*08*
U.S. Cl. D8—364

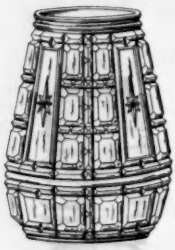
244,006
CLOSET ROD AND SHELF SUPPORT BRACKET
Robert J. Vanderley, Jenison, Mich., assignor to Leslie Metal Arts Company, Inc., Grand Rapids, Mich.
Filed Apr. 11, 1975, Ser. No. 567,319
Term of patent 14 years
Int. Cl. D8—*08*
U.S. Cl. D8—366

244,007
TONER BOTTLE
Ronald F. Feldeisen, Fairport, N.Y., assignor to Xerox Corporation, Stamford, Conn.
Filed Sept. 11, 1975, Ser. No. 612,528
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—2

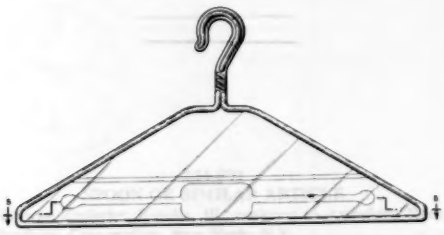


244,008
DISPENSING CONTAINER
Hans-Peter Aeschlimann, Dielheim, Germany, assignor to Dr. Molter GmbH, Heidelberg, Germany
Filed Sept. 3, 1975, Ser. No. 610,508
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—3

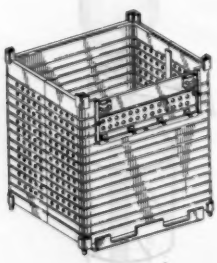
244,009
JAR
Marvin L. Kayne, Glenwood, Ill., assignor to Candle Corporation of America, Chicago, Ill.
Filed Sept. 17, 1975, Ser. No. 614,270
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—120



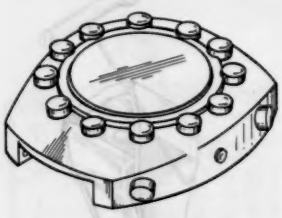
244,010
PACKAGING CONTAINER FOR A BRACELET OR THE LIKE
William Henry Young, Coventry, R.I., assignor to Textron, Inc.
Filed Jan. 3, 1975, Ser. No. 538,303
Term of patent 14 years
Int. Cl. D9—*03*
U.S. Cl. D9—195



244,011
STACKABLE MATERIAL HANDLING BOX
William R. Powell, Hubbard, Ohio, assignor to The Powell Pressed Steel Company, Hubbard, Ohio
Filed Nov. 13, 1975, Ser. No. 631,491
Term of patent 14 years
Int. Cl. D9—*03*
U.S. Cl. D9—246



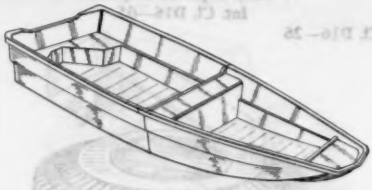
244,012
COMBINED WATCH AND CALCULATOR
Arthur F. Cake, Stamford, Conn.; Morris M. Levine, Scarsdale, N.Y.; Alena Rolny, and Paul Rolny, both of Watertown, Conn., assignors to Uranus Electronics Inc., Port Chester, N.Y.
Filed July 24, 1975, Ser. No. 598,678
Term of patent 14 years
Int. Cl. D10—*02*; D18—*01*
U.S. Cl. D10—31



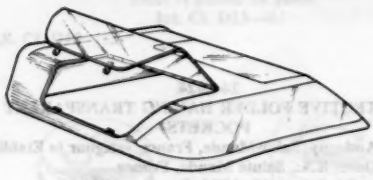
244,013
HANGING CONTAINER FOR ROOTING PLANTS
David R. Perkins, Gloucester, Mass., assignor to Glass Dimensions, Inc., Magnolia, Mass.
Filed Oct. 22, 1975, Ser. No. 624,953
Term of patent 14 years
Int. Cl. D11—*02*
U.S. Cl. D11—147

244,014
UNIVERSAL ADJUSTABLE FLAGPOLE
Sang In Kim, 4815 W. Belle Plaine Ave., Chicago, Ill. 60641
Filed Oct. 8, 1975, Ser. No. 616,352
Term of patent 14 years
Int. Cl. D11—*02*
U.S. Cl. D11—182

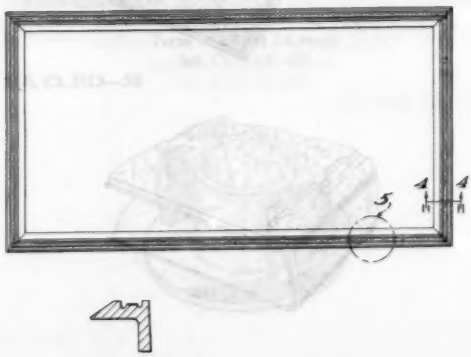
244,015
SECTIONAL BOAT
Robert E. Grind, 512 Fairview Court, Placerville, Calif. 95667
Filed Mar. 17, 1975, Ser. No. 559,317
Term of patent 14 years
Int. Cl. D12—*06*
U.S. Cl. D12—62



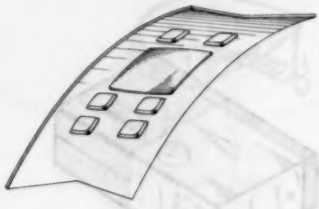
244,016
VAN TOP EXTENSION
Charles K. Waldman, 733 Saphire St., Redondo Beach, Calif. 90277
Filed Feb. 23, 1976, Ser. No. 659,988
Term of patent 14 years
Int. Cl. D12—*16*
U.S. Cl. D12—156



244,017
LICENSE PLATE HOLDER
John A. Bott, 931 Lakeshore Drive, Grosse Pointe Shores, Mich. 48236
Filed May 5, 1976, Ser. No. 683,420
Term of patent 14 years
Int. Cl. D12—*16*
U.S. Cl. D12—193



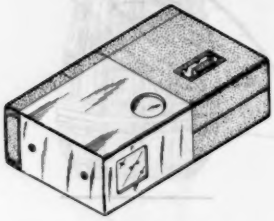
244,018
PASSENGER SERVICE UNIT PANEL
Rashad Shaker Greiss, Mercer Island, and James Stephen Yates, Seattle, both of Wash. 98146, assignors to The Boeing Company
Filed June 30, 1975, Ser. No. 591,970
Term of patent 14 years
Int. Cl. D12—*07*
U.S. Cl. D12—195

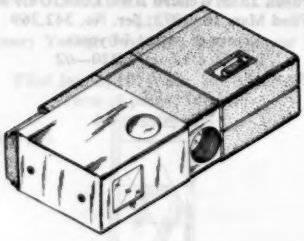


244,019
REFRIGERATED DISPLAY CASE
Robert I. Brown, 2519 Wendell Ave., Lima, Ohio 45802
Filed Mar. 16, 1973, Ser. No. 342,269
Term of patent 14 years
Int. Cl. D15—*07*; D20—*02*
U.S. Cl. D15—81

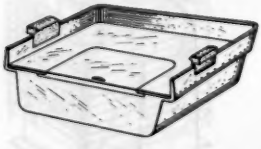
244,020
COUPLING GUARD
Richard H. Hanson, 1699 Alcan Drive, Menasha, Wis. 54952; Robert D. Roedel, 12323 Christine Drive, Wauwatosa, Wis. 53213, and Frank R. Forrest, Box No. 1, Saxeville, Wis. 54976
Filed June 16, 1975, Ser. No. 586,993
Term of patent 7 years
Int. Cl. D15—*99*
U.S. Cl. D15—148

244,021
POCKET CAMERA
Paul D. Miller, New York, and V. Lorenzo Porcelli, Ossining, both of N.Y., assignors to GAF Corporation, New York, N.Y.
Filed Mar. 4, 1976, Ser. No. 663,990
Term of patent 14 years
Int. Cl. D16—*01*
U.S. Cl. D16—05

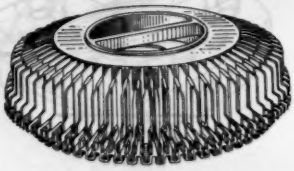




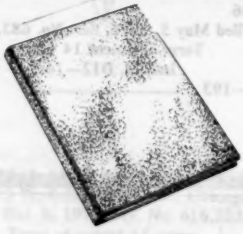
244,022
CAMERA POWER-PACK UNIT
John De Filippis, South Amboy, N.J., assignor to International Telephone and Telegraph Corporation, Nutley, N.J.
Division of Ser. No. D. 453,657, Mar. 21, 1974. This application May 15, 1975, Ser. No. 577,825
Term of patent 14 years
Int. Cl. D16—*99*
U.S. Cl. D16—10

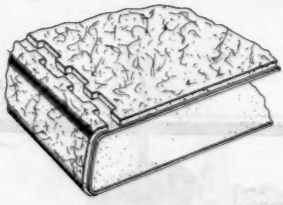


244,023
PHOTOGRAPHIC SLIDE TRAY
Herbert Wilsch, Unterhaching, and Jurgen Sylla, Munich, both of Germany, assignors to AGFA-Gevaert, A.G., Leverkusen, Germany
Filed Sept. 30, 1974, Ser. No. 511,296
Claims priority, application Germany, Apr. 1, 1974, MR 423
Term of patent 14 years
Int. Cl. D16—*05*
U.S. Cl. D16—26

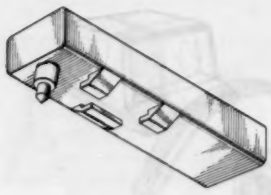


244,024
PROTECTIVE FOLDER HAVING TRANSPARENT POCKETS
Maurice Audeguy, Saint-Mande, France, assignor to Etablissements Doret S.A., Sainte Mande, France
Filed Aug. 13, 1974, Ser. No. 497,081
Claims priority, application France, Mar. 22, 1974, 74.37265
Term of patent 14 years
Int. Cl. D19—*04*
U.S. Cl. D19—27

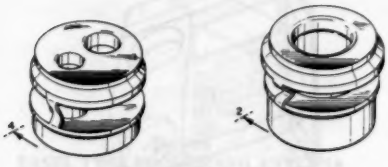




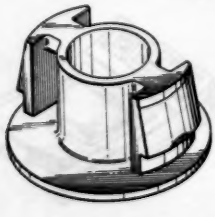
244,025
DISPOSABLE RECORDING PEN
Jerald Carl Raahauge, Escondido, Calif., assignor to Kingmann-White, Inc., Placentia, Calif.
Filed June 9, 1975, Ser. No. 584,711
Term of patent 14 years
Int. Cl. D19—*06*
U.S. Cl. D19—41



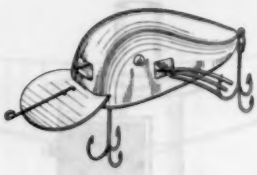
244,026
COMBINED CLAMPING GLAND AND RING FOR AN ELECTRICAL CONDUIT
Jonah Eidelberg, Huntington Station, and Thomas Mooney, Mount Sinai, both of N.Y., assignors to I-T-E Imperial Corporation, East Farmingdale, N.Y.
Filed May 1, 1975, Ser. No. 573,776
Term of patent 14 years
Int. Cl. D13—*03*
U.S. Cl. D13—13



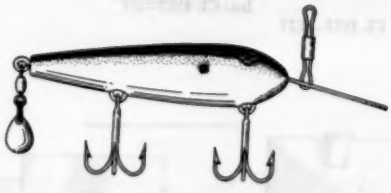
244,027
PLUG FOR ELECTRICAL JUNCTION BOXES AND CONNECTORS
Thomas Mooney, Mount Sinai, and Stephen Veselaski, Shirley, both of N.Y., assignors to I-T-E Imperial Corporation, East Farmingdale, N.Y.
Filed Sept. 17, 1975, Ser. No. 614,234
Term of patent 14 years
Int. Cl. D13—*03*
U.S. Cl. D13—30



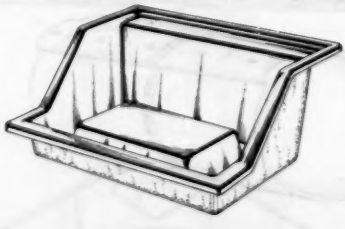
244,028
FISHING LURE
Cecil Lewis, P.O. Box 219, Smilax, Ky. 41764
Filed Aug. 1, 1975, Ser. No. 595,362
Term of patent 14 years
Int. Cl. D22—*05*
U.S. Cl. D22—27



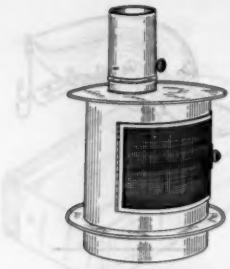
244,029
FISHING LURE
Wadere S. Shahid, Foley, Ala., assignor to Lew Childre & Sons, Inc., Foley, Ala.
Filed Apr. 12, 1976, Ser. No. 675,989
Term of patent 14 years
Int. Cl. D22—*05*
U.S. Cl. D22—28



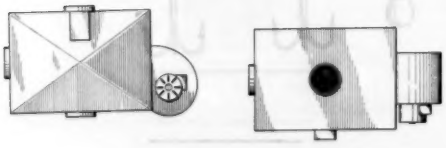
244,030
SINK
Leo K. Tongish, 10206 San Juan Ave., South Gate, Calif. 90280
Filed Oct. 28, 1975, Ser. No. 626,085
Term of patent 14 years
Int. Cl. D23—*02*
U.S. Cl. D23—58



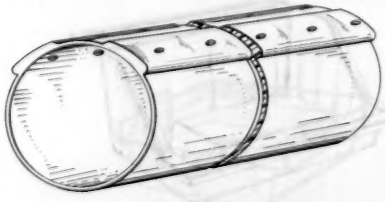
244,031
FREE STANDING FIREPLACE
Gary E. Baughman, Santa Rosa, Calif., assignor to Malm Fireplaces, Inc.
Filed Mar. 22, 1976, Ser. No. 669,176
Term of patent 14 years
Int. Cl. D23—*03*
U.S. Cl. D23—97



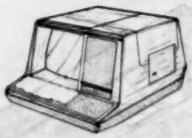
244,032
HEAT SAVING UNIT FOR USE WITH FURNACES OR THE LIKE
Niles Ellis Deetz, and Arcadio Alvarez Garcia, both of Canton, Ohio, assignors to Stack Heater's Inc.
Filed Sept. 15, 1975, Ser. No. 613,567
Term of patent 14 years
Int. Cl. D23—*03*
U.S. Cl. D23—127



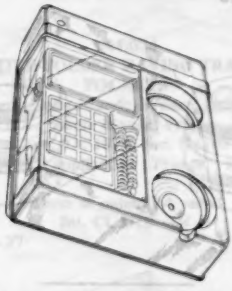
244,033
HOSE
Arthur M. Elson, Hamilton Township, Mercer County, N.J., assignor to Acme-Hamilton Manufacturing Corporation, Trenton, N.J.
Filed July 11, 1975, Ser. No. 595,154
Term of patent 14 years
Int. Cl. D23—*01*
U.S. Cl. D23—45



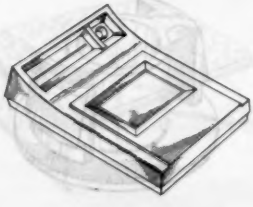
244,034
HOUSING FOR A VIDEO TERMINAL DISPLAY UNIT
Paul A. Jenkins, Groton, Mass., assignor to Digital Equipment Corporation, Maynard, Mass.
Filed Feb. 18, 1975, Ser. No. 550,691
Term of patent 14 years
Int. Cl. D14—*02*
U.S. Cl. D14—43



244,035
TELEPHONE COUPLER — CARRYING CASE AND HAND-HELD COMPUTER TERMINAL
Charles Michael Ault, Arlington, Mass., assignor to Termiflex Corporation, Nashua, N.H.
Filed May 6, 1974, Ser. No. 467,249
Term of patent 14 years
Int. Cl. D14—*03*; D13—*03*; D14—*02*
U.S. Cl. D14— 65



244,036
MEMO TRANSMITTER
Joseph L. Tyrrell, Palos Verdes, Calif., assignor to Telautograph Corporation, Los Angeles, Calif.
Filed May 4, 1976, Ser. No. 682,952
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D14—52

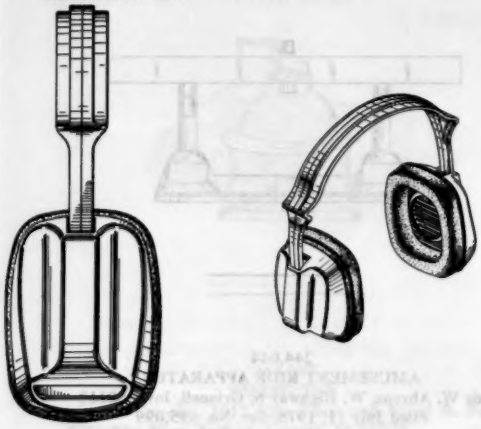


244,037

ACOUSTICAL HEAD-SET

Donald E. Warner, North Hollywood, and George C. Oyama, Tujunga, both of Calif., assignors to Audiotronics Corporation, North Hollywood, Calif.

Filed June 16, 1976, Ser. No. 696,798
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D14—36

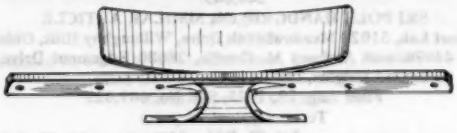


244,038

EASEL TYPE BOOMERANG ANTENNA

Ernest Pizon, Saint Cloud, France, assignor to Mecaniplast, Clichy, France

Filed July 2, 1976, Ser. No. 702,484
Claims priority, application France, July 7, 1976, 76.74457
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D14—86

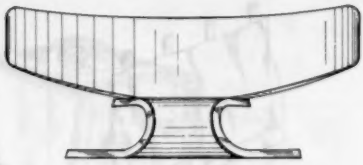


244,039

EASEL TYPE ANTENNA

Ernest Pizon, Saint Cloud, France, assignor to Mecaniplast, Clichy, France

Filed July 2, 1976, Ser. No. 702,485
Claims priority, application France, July 7, 1976, 74.457
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D14—86



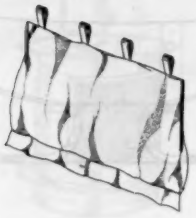
244,040

BOOMERANG ANTENNA

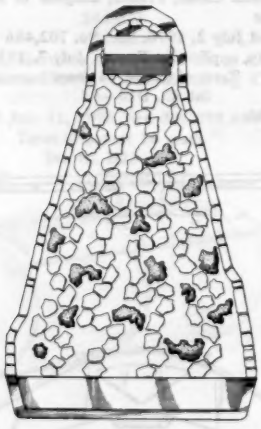
Ernest Pizon, Saint Cloud, France, assignor to Mecaniplast, Clichy, France

Filed July 2, 1976, Ser. No. 702,486
Claims priority, application France, July 7, 1976, 74.457
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D14—86

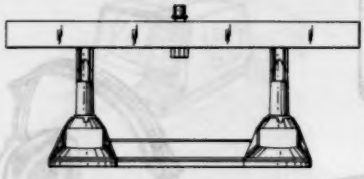
244,041
CATTLE DUSTING BAG
Scott Stewart, 901 Watson Ave., Madison, Wis. 53713
Filed Nov. 6, 1975, Ser. No. 629,309
Term of patent 14 years
Int. Cl. D30—99
U.S. Cl. D30—02



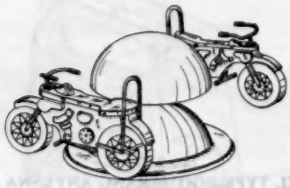
244,042
GAME BOARD
Adolph E. Goldfarb, 4614 Monarca Drive, Tarzana, Calif. 91345, and Erwin Benkoe, 17965 Medley Drive, Encino, Calif. 91316
Filed Feb. 10, 1975, Ser. No. 548,693
Term of patent 14 years
Int. Cl. D21—01
U.S. Cl. D34—5 SS



244,043
TOY BALANCING BEAM
Osamu Takahashi, Tokyo, Japan, assignor to Tomy Kogyo Co., Ltd., Tokyo, Japan
Filed July 7, 1975, Ser. No. 593,237
Term of patent 14 years
Int. Cl. D21—01
U.S. Cl. D34—5 K

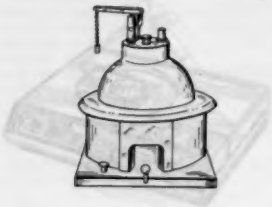


244,044
AMUSEMENT RIDE APPARATUS
Claude W. Ahrens, W. Highway 6, Grinnell, Iowa 50112
Filed July 11, 1975, Ser. No. 595,099
Term of patent 14 years
Int. Cl. D21—03
U.S. Cl. D34—5 L

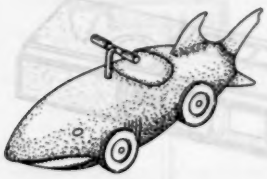


244,045
SKI POLE HANDGRIP OR SIMILAR ARTICLE
Josef Lah, 31020 Meadowbrook Drive, Willoughby Hills, Ohio 44094, and Anthony M. Gentile, 25080 Edgemont Drive, Richmond Heights, Ohio 44143
Filed Aug. 29, 1975, Ser. No. 609,025
Term of patent 14 years
Int. Cl. D21—02
U.S. Cl. D34—14 D

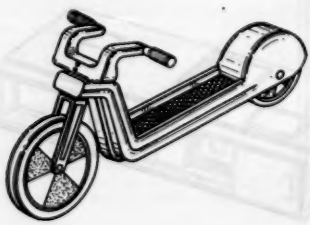
244,046
TOY STEAM ENGINE
Jockum Krumlinde, Vittsjo, Sweden, assignor to AB Alga, Vittsjo, Sweden
Filed May 30, 1975, Ser. No. 582,111
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15 S



244,047
RIDING TOY
Donald R. Daverin, 1017 Kim Place, and Mikel R. Powell, 1021 Kim Place, both of, Lemont, Ill. 60439
Filed Dec. 8, 1975, Ser. No. 638,343
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15 AJ

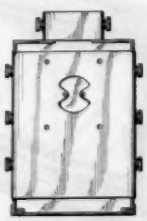


244,048
SCOOTER
Donald R. Daverin, 1017 Kim Place, Lemont, Ill. 60439
Filed Dec. 8, 1975, Ser. No. 638,344
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15 AT



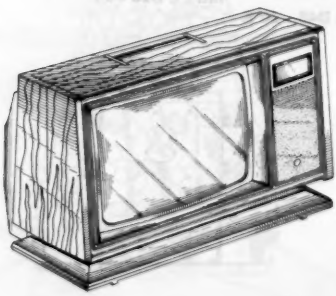
244,049
FIBER OPTIC LIGHT SOURCE OR SIMILAR ARTICLE
Richard E. Feinbloom, New York, and Laszlo Endrodi, Elmhurst, both of N.Y., assignors to Designs for Vision, Inc., New York, N.Y.
Filed Dec. 3, 1974, Ser. No. 529,221
Term of patent 14 years
Int. Cl. D26—*05*
U.S. Cl. D48—20 E

244,050
ADJUSTABLE HOUSING FOR HIGH INTENSITY LAMPS
Edwin H. Lauth, 1025 Augusta Drive, Sun City Center, Fla. 33570
Filed May 21, 1975, Ser. No. 579,556
Term of patent 14 years
Int. Cl. D26—*05*
U.S. Cl. D48—20 E



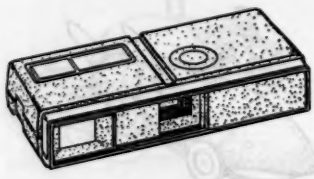
244,051
GUITAR BRIDGE
Bozo Podunavac, 713 E. Valley Parkway Blvd., Escondido, Calif. 92025
Filed Dec. 30, 1974, Ser. No. 537,340
Term of patent 14 years
Int. Cl. D17—99
U.S. Cl. D56—1 A

244,052
TELEVISION RECEIVER
Melvin H. Boldt, Glenview, and David P. Chuboff, North Barrington, both of Ill., assignors to Zenith Radio Corporation, Glenview, Ill.
Filed Apr. 4, 1975, Ser. No. 565,334
Term of patent 7 years
Int. Cl. D14—*01*
U.S. Cl. D14—80

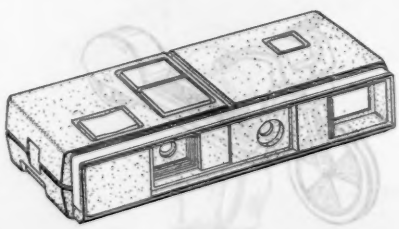


244,053
AUDIO VISUAL RECORD PLAYER
Rebertus Van De Poel, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.
Filed Jan. 30, 1975, Ser. No. 545,624
Claims priority, application Switzerland, Aug. 19, 1974, 59308/74
Term of patent 14 years
Int. Cl. D14—*01*
U.S. Cl. D14—2

244,054
CAMERA
Moto Shimano, and Walter Nakano, both of Los Angeles, Calif., assignors to Optigon Research & Development Corporation, Santa Monica, Calif.
Division of Ser. No. 419,591, Nov. 28, 1973, Pat. No. Des. 236,546.
This application Oct. 11, 1974, Ser. No. 514,189
Term of patent 14 years
Int. Cl. D16—*01*
U.S. Cl. D16—6

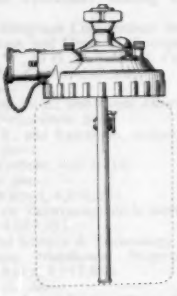


244,055
CAMERA
Moto Shimano, and Walter Nakano, both of Los Angeles, Calif., assignors to Optigon Research & Development Corporation, Santa Monica, Calif.
Division of Ser. No. 419,591, Jan. 28, 1973, Pat. No. Des. 236,546.
This application Oct. 11, 1974, Ser. No. 514,190
Term of patent 14 years
Int. Cl. D16—*01*
U.S. Cl. D16—6

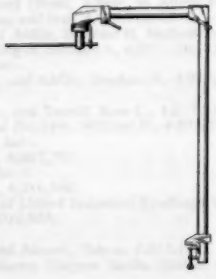


244,056
COMBINED TAPER AND HOLDER THEREFOR
Louis Phillip Jimenez, 1878 15th Ave., San Francisco, Calif. 94122, and Charles Houck, 47 Muth Drive, Orinda, Calif. 94563
Filed Aug. 11, 1975, Ser. No. 603,389
Term of patent 14 years
Int. Cl. D26—*01*
U.S. Cl. D73—1 R

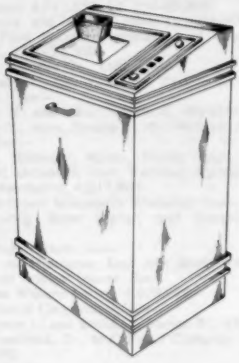
244,057
NEBULIZER COVER OR SIMILAR ARTICLE
Robert J. Aul, Perrysburg, Ohio; Robert S. Babington, McLean, Va.; Glenn H. Dunlap, Maumee, and Wayne J. Zitkus, Toledo, both of Ohio, assignors to American Hospital Supply Corporation, Evanston, Ill.
Filed May 14, 1975, Ser. No. 577,529
Term of patent 14 years
Int. Cl. 24—*02*
U.S. Cl. D24—62



244,058
SUPPORTING DEVICE FOR SLINGS AND THE LIKE
Adolf Kowal, Tagarp 10, S-270 54 Tommarp, Sweden
Filed May 20, 1975, Ser. No. 579,083
Claims priority, application Sweden, Nov. 21, 1974, 741942
Term of patent 14 years
Int. Cl. D24—*02*
U.S. Cl. D24—64



244,059
PARCEL AND LETTER X-RAY INSPECTION UNIT
Victor E. De Lucia, and William R. Ivy, both of Los Angeles, Calif., assignors to Torr Laboratories, Inc.
Filed June 30, 1975, Ser. No. 591,357
Term of patent 14 years
Int. Cl. D24—*01*
U.S. Cl. D10—104



244,060
COIN HOLDER
Terry M. Friend, Alameda, Calif., assignor to Tom Numelin, Woodacre, Calif.
Filed June 26, 1975, Ser. No. 590,436
Term of patent 14 years
Int. Cl. D3—*02*
U.S. Cl. D87—3 B

LIST OF PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 12TH DAY OF APRIL, 1977

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

A/S Weston Toeppefabrik: *See—*
Bruhn, Esben; and Jensen, Finn Hansen, 4,017,345.

Aas, Flemming; and Jensen, Ole Dollerup, to Radiometer A/S. Electrochemical measuring electrode. 4,017,374, Cl. 204-195.00P.

Abbott Laboratories: *See—*
Jones, Peter Hadley; Kyncl, Jaroslav; Ours, Carroll Wayne; and Somani, Pitambar, 4,017,636.
Roteman, Robert, 4,017,513.

Abbott, Roy W., to General Electric Company. Method of adapting a mobile home for an air conditioner. 4,016,641, Cl. 29-469.000.

Abe, Akira: *See—*
Tomono, Masami; Abe, Akira; Harada, Seiki; Sato, Kikuji; Takagi, Takeshi; Kamoshita, Genichi; Oya, Yuichiro; and Saiki, Atsushi, 4,017,886.

Abe, Masahiro: *See—*
Onoe, Katsuhiko; Abe, Masahiro; and Tamura, Masashi, 4,017,004.

Abex Corporation: *See—*
Born, Ellis H.; and Thurston, David L., 4,017,219.

Abraham, Norman J. Appliance for coin-operated devices. 4,016,937, Cl. 273-1.00R.

Accumulatorenwerk Hoppecke Carl Zoellner & Sohn: *See—*
Klein, Jurgen, 4,016,638.

ACF Industries, Incorporated: *See—*
Morrison, Bert L., 4,017,058.
Watt, Elbert D., 4,017,710.

Acres Consulting Services Limited: *See—*
Simpson, Peter Joseph, 4,017,122.

Adams, Arthur: *See—*
Hawley, Lee E., 4,017,267.

Adams, Claude L.; and Flores, Sergio, to Flowers Tool Inc. Means for renovating worn cylindrical bearing surfaces. 4,017,201, Cl. 408-82.000.

Adddressograph Multigraph Corporation: *See—*
Yen, Nai-Chyuan; and Marinoff, George, 4,017,180.

Adelstein, Gilbert W., to G. D. Searle & Co. 1,1-Diaryl-1H-tetrazole amines. 4,017,491, Cl. 260-247.50E.

Aepli, Otto T.: *See—*
Sorgenfrei, Malachi E.; and Aepli, Otto T., 4,017,410.

Aerojet-General Corporation: *See—*
Steele, Roger B.; and Katzakian, Arthur, Jr., 4,017,429.

AGA Aktiebolag: *See—*
Teiling, Carl Torbern, 4,017,716.

AGA Radiator AB: *See—*
Jensen, Poul Wilfred, 4,016,834.

Agence Nationale de Valorisation de la Recherche (ANVAR): *See—*
Sardos, Rene, 4,017,153.

Agency of Industrial Science & Technology: *See—*
Akami, Hitoshi; Nishikawa, Shigeru; Ikeda, Toshio; and Tsukokura, Akira, 4,017,894.

AGFA-Gevaert, A.G.: *See—*
Helmberger, Josef; and Stadler, Klaus, 4,017,891.
Lermann, Peter; Fauth, Gunter; and Muller, Herbert, 4,017,879.
Meyer, Rudolf; and Hoffmann, Klaus, 4,017,869.
Wick, Richard; Bestenreiner, Friedrich; Giglberger, Dieter; Wetzel, Gunter; Schott, Walter; V. Engeland, Josef Leonard; and Verlinden, Willy Gommaire, 4,017,171.

AGFA-GEVAERT N.V.: *See—*
De Cat, Arthur Henri; Danckaert, Valere Frans; Sels, Francis Jeanne; and Pollet, Robert Joseph, 4,017,473.

Agnew, S. J.: *See—*
Jones, Allen Jacob, 4,017,254.

Ahrweiler, Karl-Heinz, to Kusters, Edward. Apparatus for avoiding an excess of pressure in a continuous press. 4,017,235, Cl. 425-149.000.

Aichinger, Dietmar; and Obrist, Albert, to Albert Obrist AG. Container with screw cap and seal. 4,016,996, Cl. 215-344.000.

Aidlin, Samuel S.; and Aidlin, Stephen H. Method and apparatus for internal spray cleaning of containers. 4,017,330, Cl. 134-21.000.

Aidlin, Stephen H.: *See—*
Aidlin, Samuel S.; and Aidlin, Stephen H., 4,017,330.

Airco, Inc.: *See—*
Moore, George L.; and Terrell, Ross C., 4,017,519.
Sielaff, Ulrich; and Peickert, Wilfried R., 4,016,864.

Airmag Surveys, Inc.: *See—*
Black, Robert M., 4,017,791.

Airpot Corporation: *See—*
Wilcox, Lance C., 4,016,960.

Airtex Products, Div. of United Industrial Syndicate, Inc.: *See—*
Ulm, Ralph E., 4,016,906.

Aizawa, Tatsuo: *See—*
Washio, Takaji; and Aizawa, Tatsuo, 4,017,175.

Akami, Hitoshi; Nishikawa, Shigeru; Ikeda, Toshio; and Tsukokura, Akira, to Agency of Industrial Science & Technology; and Daido-Maruta Finishing Co., Ltd. Method for preparing color separation printing patterns. 4,017,894, Cl. 358-80.000.

Akashi, Mitsumasa; and Makio, Toshio, to Kabushiki Kaisha Komatsu Seisakusho. Pilot operated pressure and vacuum relief valve. 4,016,903, Cl. 137-493.500.

Akebono Brake Industry Co., Ltd.: *See—*
Kurata, Masayuki; and Watanabe, Yusiyo, 4,017,089.

Aker, Jimmie R.: *See—*
Cullen, Roy H.; and Aker, Jimmie R., 4,016,943.
Cullen, Roy H.; Aker, Jimmie R.; and Witovek, Jim, Jr., 4,017,113.

Akino, Morio: *See—*
Tsukamoto, Hiroyuki; Akino, Morio; Hara, Satoshi; Kikuchi, Kazuyoshi, deceased; Kon, Yumiko, representative; and Kon, Jun, representative, 4,017,904.

Aktiebolaget Karlstads Mekaniska Werkstad: *See—*
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Bjork, Jan; and Holmgren, Kjell Ake Bertil, 4,016,815.

Aktiengesellschaft Adolph Saurer: *See—*
Porter, Allan William Henry, 4,016,909.

Albany International Corporation: *See—*
Coplan, Myron J.; and Brooks, Thomas W., 4,017,030.

Albee, Percy Frederick, Jr., to Q-Panel Company. Easel. 4,017,049, Cl. 248-464.000.

Albert Obrist AG: *See—*
Aichinger, Dietmar; and Obrist, Albert, 4,016,996.

Albertson, Orris E., to Dorr-Oliver Incorporated. Split treatment phosphorus removal from waste. 4,017,388, Cl. 210-5.000.

Aldrich, Paul Harwood, to Hercules Incorporated. Aqueous dispersions of wax blends and a water-soluble cationic resin and paper sized therewith. 4,017,431, Cl. 260-18.00N.

Alestig, Ludvig Rune Ingvar; and Gustavsson, Gote Ivar, to Aktiebolaget Karlstads Mekaniska Werkstad. Runner for hydrodynamic machines. 4,017,211, Cl. 416-183.000.

Alicot, Michel Jean Camille: *See—*
Mingasson, Georges Raymond Henry; Montu, Michel Louis Jules; and Alicot, Michel Jean Camille, 4,017,506.

Allen Group Inc., The: *See—*
Barber, Ivan J.; and Whetham, Calvin, 4,016,619.

Allen, William P. Portable projection screen. 4,017,152, Cl. 350-117.000.

Allied Chemical Corporation: *See—*
O'Brien, John B.; Pisanchyn, John; and Colby, S. Robert, 4,017,301.
Trent, Robert Harold, 4,017,121.

Allis-Chalmers Corporation: *See—*
Heckenkamp, Edward B., 4,016,908.
Heian, Glenn A., 4,017,264.
Plate, John R.; and Heisig, Charles P., 4,016,949.

Allison, Robert D. Garment for impedance plethysmograph use. 4,016,868, Cl. 128-2.10E.

Allison, William D., to Ford Motor Company. Suspension arm and joint assembly. 4,016,950, Cl. 280-674.000.

Allmanna Svenska Elektriska Aktiebolaget: *See—*
Gustafsson, Sven-Goran; Larsson, Hans Gunnar; Lilja, Kjell; Lundback, Bertil; Nilsson, Jan; and Syvakari, Pertti, 4,016,737.

Allport, Walter F. Apparatus for copying translucent documents. 4,017,184, Cl. 355-109.000.

Almer, Friedrich Hermann Raymund; and Kostlin, Heiner, to U.S. Philips Corporation. Incandescent lamp with infrared filter. 4,017,758, Cl. 313-112.000.

Altenburger, Otto, to Stromberg-Carlson Corporation. Number translator. 4,017,691, Cl. 179-18.0ET.

Alter, S.A.: *See—*
Letelier, Carlos Sunkel; and CilleroGrafulla, Fernando, 4,017,502.

Aluminum Company of America: *See—*
Collins, John W., III; and Douds, E. Scott, 4,017,704.
Maier, Ralph D., 4,016,924.

Alvarez, Robert T. Polyalloy of polyphenylene sulfide and polyimide. 4,017,555, Cl. 260-857.0PA.

Alza Corporation: *See—*
Theeuwes, Felix; and Damani, Nalinkant C., 4,016,880.

Amax Inc.: *See—*
Vukasovich, Mark S.; and Sullivan, Francis J., 4,017,315.

American Cyanamid Company: *See—*
Buell, Bennett George; and Loffelman, Frank Fred, 4,017,486.
Cross, Barrington; and Walworth, Bryant Leonidas, 4,017,298.
Diehl, Robert Eugene; and Walworth, Bryant Leonidas, 4,017,299.
Doering, Arthur Albert, 4,017,415.
Gordon, John Edson; and Ralston, Robert A., 4,017,501.
Hoffman, Joseph Adrian, 4,017,455.

Los, Marinus, 4,017,510.
Schaub, Robert Eugene; Floyd, Middleton Brawner, Jr.; and Weiss, Martin Joseph, 4,017,534.
Tucker, Robert Jerome; and Greenwood, Ruth, 4,017,456.
Wang, Samuel S., 4,017,556.

American Home Products Corporation: *See—*
Gomez, Eloy A.; and Levin, Howard J., 4,017,616.
Yardley, John P.; and Russell, Peter B., 4,017,637.

American Induction Heating Corporation: *See—*
Lavins, Paul N., Jr.; and Vanek, Willard J., 4,017,703.

American Laser Corporation: *See—*
McMahon, William Henry, 4,017,745.

American Optical Corporation: *See—*
Keating, Daniel William, 4,017,868.
Robinson, Charles C., 4,017,238.
Sussman, Milton H., 4,017,159.

Amidon, Alan B., to Xerox Corporation. Process for preparing relief printing masters and molds. 4,017,581, Cl. 264-220.000.

AMP Incorporated: *See—*
Gilissen, Hermanus Petrus Johannes, 4,016,647.
Reavis, Robert Philmore, Jr.; and Soderstrom, Melvin Andrew, 4,017,140.
Taguchi, Hiroshi, 4,017,135.

Amsen, Willem Hendrik: *See—*
Smeulers, Wouter; and Amsen, Willem Hendrik, 4,017,681.

Amsler, Kurt: *See—*
Audykowski, Thaddeus; and Amsler, Kurt, 4,017,449.

Anchor Hocking Corporation: *See—*
Conroy, Gary D.; and Scott, John D., 4,017,194.

Anderberg, Paul-Henry Botvid; Hambitzer, Hans Gunnar Gunther; and Sander, Nils Borje Lennart, to Svenska Aktiebolaget Bromsregulator. Method and device for dynamically measuring brake forces. 4,016,755, Cl. 73-121.000.

Anderson, Alfred T.: *See—*
Gordy, Robert S.; Anderson, Alfred T.; and Sanders, David E., 4,017,798.

Anderson, John Erling, to Union Carbide Corporation. Pyrolysis process for converting refuse to fuel gas. 4,017,273, Cl. 48-209.000.

Anderson, John M., to General Electric Company. Electrodeless fluorescent lamp having a radio frequency gas discharge excited by a closed loop magnetic core. 4,017,764, Cl. 315-248.000.

Anderson, Larry W.; and McDonald, Michael P., to Westinghouse Electric Corporation. Train vehicle control apparatus. 4,017,044, Cl. 246-182.00B.

Anderson, Otis F. Pneumatic impacter. 4,016,873, Cl. 128-54.000.

Anderson, Raymond L. Holding device for screw drivers and the like. 4,016,913, Cl. 145-52.000.

Anderson, Robert William; Knowles, William Ralph; and Culley, John Edward, to Image Analysing Computers Limited. Methods and apparatus involving light pen interaction with a real time display. 4,017,680, Cl. 358-242.000.

Andino, Rosemary: *See—*
McMullen, William H.; and Andino, Rosemary, 4,017,363.

Andreas Stihl Maschinenfabrik: *See—*
Dietzsch, Gunter; Frers, Gerd; Henning, Klaus; and Lux, Helmut, 4,016,964.

Andreev, Georgy Vasilievich: *See—*
Puchko, Alexandr Vladimirovich; Klushin, Valery Alexandrovich; Andreev, Georgy Vasilievich; Gorbunov, Eduard Matveevich; Makushok, Evgeny Markellovich; Schukin, Valery Yakovlevich; and Segal, Vladimir Mironovich, 4,016,738.

Andrews, Theodore E.; Weller, John J.; and Benson, Rudolph T., Jr., to Armstrong Cork Company. Multiple rotary casting machine. 4,017,234, Cl. 425-145.000.

Angelopoulos, Peter G.: *See—*
Pederson, Carl N.; and Angelopoulos, Peter G., 4,017,683.

Angevine, Peter A.; and Leyshon, David W., to Dorr-Oliver Incorporated. Fluid bed calcination process. 4,017,585, Cl. 423-167.000.

Anwer, Jamil; Banchik, Ira Norman; Bode, Gerhard Wilhelm; Lemberg, Werner; and Sud, Kuldip Kumar, to Bamag Verfahrenstechnik GmbH. Process for gasifying solid carbonaceous fuel. 4,017,272, Cl. 48-197.00R.

Apellaniz, Norberto. Table game. 4,017,079, Cl. 273-126.00R.

Applicazione Elettrotelefoniche SpA: *See—*
Valfre, Cesare, 4,017,770.

Arai, Kenichi: *See—*
Komura, Masaru; and Arai, Kenichi, 4,017,169.

Araki, Yoshihiko: *See—*
Kiyota, Takashi; Araki, Yoshihiko; and Hayashi, Hideo, 4,017,355.

Aramaki, Shigeru, to Tamagawa Seiki Kabushiki Kaisha. Synchro-to-digital converter. 4,017,846, Cl. 340-347.0SY.

Archibald Kenrick and Sons Limited: *See—*
Hamblin, Richard David, 4,017,108.

Archifar Industrie Chimiche del Trentino S.p.A.: *See—*
Marsili, Leonardo; Rossetti, Vittorio; and Pasqualucci, Carmine, 4,017,481.

Arciniega Blanco, Moises. Bullet for hunting shotguns. 4,016,817, Cl. 102-92.400.

ARCO Polymers, Inc.: *See—*
Granda, Jose E.; Quinlan, John J.; and Garland, James J., 4,017,427.
Spicuzza, John P., Jr.; and Mills, Frank J. E., 4,017,670.

Arend, Gunter; Schaffner, Heinz; and Schramm, Jurgen, to Bayer Aktiengesellschaft. Process for the production of (meth)allyl phosphonic acid dialkyl esters. 4,017,564, Cl. 260-969.000.

Ariga, Masao: *See—*
Komori, Shigehiro; Sakamaki, Hisashi; Ariga, Masao; Nitanda, Hiroshi; and Nagasawa, Seigi, 4,017,173.

Armour Pharmaceutical Company: *See—*
Rubino, Andrew M., 4,017,599.

Armstrong Cork Company: *See—*
Andrews, Theodore E.; Weller, John J.; and Benson, Rudolph T., Jr., 4,017,234.

Arnold, James F. Oil well producing method and system. 4,016,930, Cl. 166-266.000.

Artrip, Robert W., to Cleveland Machine Controls, Inc. Fault detector circuit with two-fault memory. 4,017,775, Cl. 318-139.000.

Asahi Kogaku Kogyo Kabushiki Kaisha: *See—*
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Asberg, Per Anders: *See—*
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ASG Industries, Inc.: *See—*
Cooke, William C., 4,016,645.

Ashaway Line & Twine Mfg. Co.: *See—*
Crandall, Julian Titsworth; and Crandall, Steven Julian, 4,016,714.

Ashland Oil, Inc.: *See—*
Gannon, Charles R., 4,017,323.

Ashton, Wallace T.; and Rogers, Edward F., to Merck & Co., Inc. Antifungal 1-substituted benzimidazoles. 4,017,503, Cl. 260-302.00H.

Ashton, Wallace T.; and Rogers, Edward F., to Merck & Co., Inc. Antifungal 1-substituted benzimidazoles. 4,017,504, Cl. 260-302.00H.

Ashton, Wallace T.: *See—*
Rogers, Edward F.; Ashton, Wallace T.; and Dybas, Richard A., 4,017,505.

Asioli, Zeo. Pressure and flow-regulating valve for automatic or semiautomatic-cycle lubricating system. 4,016,897, Cl. 137-107.000.

Aspro, Inc.: *See—*
Kraft, Derald H.; and St. John, Richard C., 4,016,642.
St. John, Richard C., 4,016,963.

Associated Electrical Industries Limited: *See—*
Friedlander, Erich Siegfried, 4,017,790.

Assow, Bengt Holger; and Rolleberg, Kjell Ove, to Telefonaktiebolaget L M Ericsson. Power transistor drive apparatus in a DC-converter. 4,017,783, Cl. 321-2.000.

Astley, Edward Pryce; Jones, Owen Morris; and Law, Kenneth William, to Dunlop Limited. Pneumatic tires. 4,016,915, Cl. 152-355.000.

Atlantic Richfield Company: *See—*
Howell, Eddie P.; and Gant, Orland J., Jr., 4,017,731.
Reed, Dale H.; and Hardison, Jack E., 4,016,952.

Atom Chemical Paint Co., Ltd.: *See—*
Ueno, Yoshiaki; Nishiumi, Yoshio; and Nagasaka, Yukio, 4,017,222.

Aubrecht, Richard A.; and Hart, Richard N., to Moog Inc. Method of providing a torque motor with air gaps of equal length. 4,017,706, Cl. 219-69.00M.

Audesse, Emery G.; Colville, William T.; Shaffer, John W.; and Mecone, David W., to GTE Sylvania Incorporated. Multilamp photoflash unit having radiant-energy-activated quick-disconnect switch. 4,017,728, Cl. 240-1.300.

Audi NSU Auto Union Aktiengesellschaft: *See—*
Leitermann, Wulf; and Zimmermann, Hans-Georg, 4,016,635.

Audykowski, Thaddeus; and Amsler, Kurt, to Ciba-Geigy Corporation. Mixture for the manufacture of antistatic floor coverings and coatings. 4,017,449, Cl. 260-33.6EP.

August Thyssen-Hutte AG: *See—*
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Augustine, Robert John: *See—*
Cline, Melvin N.; Augustine, Robert John; and Westphal, Donald John, 4,016,663.

Aupoix, Marcel; and Trezeguet, Jean-Pierre, to Les Cables de Lyon. Wave guide and method for the manufacturing thereof. 4,017,814, Cl. 333-95.00R.

Austin, Philip R., to Contamination Control Laboratories, Inc. Clean air workbench. 4,016,809, Cl. 98-115.0LH.

Automobiles Peugeot: *See—*
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Laine, Gabriel, 4,017,059.

Automotive Products Company Limited: *See—*
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Avicon, Inc.: *See—*
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Azzaroni, Giovanni. Tunnel like formwork. 4,017,052, Cl. 249-183.000.

Bacskai, Robert, to Chevron Research Company. Process for polymerization of 2-pyrrolidone. 4,017,465, Cl. 260-78.00P.

Baer, Karl: *See—*
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Bagby, John F., to Spin Physics, Inc. Single-track video ferrite record-/reproduce head and manufacturing method therefor. 4,017,899, Cl. 360-122.000.

Bai, Henry S. Target game. 4,017,076, Cl. 273-102.00R.

Bailey, August V.; Boudreaux, Gordon J.; Sumrell, Gene; and Novak, Arthur F., to United States of America, Agriculture. N-(furoyloxyethyl) fatty acid amides. 4,017,522, Cl. 260-347.500.

Bailey, Fay W., to Phillips Petroleum Company. Inhibition of poly(ary-

lene sulfide) resin induced metal corrosion. 4,017,450, Cl. 260-37.00R.
Bailey, Ronald Barry, to General Electric Company. Load voltage clamping circuit for voltage turn-off chopper. 4,017,777, Cl. 318-342.000.
Baird, William Chalmers, Jr.; Bearden, Roby, Jr.; and Bollinger, Ralph Louis, Jr., to Exxon Research and Engineering Company. Process for desulfurization of residua with sodamide-hydrogen and regeneration of sodamide. 4,017,381, Cl. 208-143.000.
Baker, Alfred Lynn, to RCA Corporation. Squelch circuit for a video record player. 4,017,677, Cl. 358-127.000.
Baker, Alfred Lynn, to RCA Corporation. End-of-play control system. 4,017,678, Cl. 358-128.000.
Baker, Don R., to Stauffer Chemical Company. Inhibiting growth of bacteria, fungi and algae with a lower alkyl tri-n-octyl phosphonium diphenyl phosphate. 4,017,610, Cl. 424-204.000.
Baker, Donald J.; and Jackson, Robert W., to Bendix Corporation, The. Rack and pinion steering gear. 4,016,774, Cl. 74-424.600.
Baker, Kenneth L., to Sperry Rand Corporation. Data recovery system resistant to frequency deviations. 4,017,803, Cl. 329-104.000.
Baker, William C.; and Chapman, John J., to Teledyne, Inc. Fluid flowmeter. 4,016,759, Cl. 73-204.000.
Baker, William R.: *See*—
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Bakumenko, Sergei Panteleevich: *See*—
Paton, Boris Evgenievich; Lakomsky, Viktor Iosifovich; Torkhov, Gennady Fedorovich; Trigub, Vladimir Kirillovich; Sheiko, Ivan Vasilievich; Verkhovtsev, Emil Vasilievich; Bakumenko, Sergei Panteleevich; Ponomarev, Nikolai Alexeevich; and Kuzmin, Anatoly Alexandrovich, 4,017,672.
Baldwin, Bruce B.; and Hammer, Robert N., to Belknap Corporation. Drag reducing composition and method. 4,016,894, Cl. 137-13.000.
Ball, Leonard M. Laser lightning rod system. 4,017,767, Cl. 361-117.000.
Bally Manufacturing Corporation: *See*—
Burnside, Walter M., 4,017,077.
Baltimore Brushes, Inc.: *See*—
O'Connell, Gerard P., 4,016,802.
Bamag Verfahrenstechnik GmbH: *See*—
Anwer, Jamil; Banchik, Ira Norman; Bode, Gerhard Wilhelm; Lemberg, Werner; and Sud, Kuldip Kumar, 4,017,272.
Banchik, Ira Norman: *See*—
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Banys, Algis Raymond, to Sperry Rand Corporation. Mechanized file carrier stabilization system. 4,017,132, Cl. 312-268.000.
Baraff, David Robbin; Boynton, Robert James; and Westwood, William Dickson, to Northern Electric Company, Limited. Thermal printing device. 4,017,712, Cl. 219-216.
Baranyi, Sandor J., to Trochoidal Gear Technology, Inc. Hypotrochoidal cluster gear drives. 4,016,780, Cl. 74-804.000.
Barber, Ivan J.; and Whetham, Calvin, to Allen Group Inc., The. Car washing apparatus having slow speed relief. 4,016,619, Cl. 15-53.0AB.
Barbey, Jacques, to Rhone-Poulenc-Textile. Process and apparatus for manufacturing non-woven webs of continuous thermoplastic filaments. 4,017,580, Cl. 264-210.00F.
Barclay, Kenneth M.; Birk, James R.; and Parkins, William E., to Rockwell International Corporation. Process for production of synthesis gas. 4,017,271, Cl. 48-197.00R.
Barile, Peter, Sr. Bed frame for hospital-type bed. 4,016,612, Cl. 5-200.00C.
Barmag Barmer Maschinenfabrik Aktiengesellschaft: *See*—
Lenk, Erich, 4,017,249.
Barnes, William E., to Empire Tool Company. Indexable insert type cutting toolholders. 4,016,634, Cl. 29-96.000.
Baron, Arthur L.; and Sivaramakrishnan, Parameswar, to Mobay Chemical Corporation. Flame retardant polycarbonate compositions. 4,017,457, Cl. 260-45.75P.
Barr and Stroud Limited: *See*—
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Barraud, Andre; and Messier, Jean, to Commissariat a l'Energie Atomique. Dielectric material having monomolecular layers and capacitors in which said material is employed. 4,017,660, Cl. 428-411.000.
Barrett, Harrison H., to Raytheon Company. Radiographic imaging system for high energy radiation. 4,017,730, Cl. 250-363.00S.
Barry, Samuel M., to Raymond Lee Organization, Inc., The, a part interest. Magnetic sweeper. 4,017,386, Cl. 209-215.000.
Bartels, Eugene L.; and Fleming, Robert B., to General Electric Company. Heat exchanger core having expanded metal heat transfer surfaces. 4,016,928, Cl. 165-141.000.
Barthalon, Maurice; and Subtil, Andre, to Barthalon, Maurice. Electromagnetic system for propulsion and programmed positioning. 4,017,001, Cl. 221-5.000.
Bartlett, Joseph E. Sighting device for a vehicle. 4,016,653, Cl. 33-264.000.
Barzda, Justin J., to United States of America, Navy. Deployable rotor. 4,017,043, Cl. 244-138.00A.
BASF Aktiengesellschaft: *See*—
Bosche, Horst Guenter; Baer, Karl; and Schneider, Kurt, 4,017,494.
Gath, Rudolph Hans; and Fuchs, Hugo, 4,017,482.
Koester, Eberhard; Wunsch, Gerd; Deigner, Paul; Stumpfi, Werner; and Schneehage, Hans Henning, 4,017,303.
Kummer, Rudolf, 4,017,550.
Lenz, Werner; Woellhaf, Josef; Spreng, Klaus; Zuerger, Manfred; Hecke, Paul; Hoffmann, Gerhard; and Obradovic, Milan, 4,017,183.
Schmidt, Franz; Fahrbach, Gerhard; Schenk, Wolfgang; and Seiler, Erhard, 4,017,558.
Voelkl, Erfried; Schreiner, Siegfried; Wunsch, Gerd; Kiener, Volker; Waibel, Rudi; and Koester, Hartwig, 4,017,593.
BASF Wyandotte Corporation: *See*—
Sorgenfrei, Malachi E.; and Aepli, Otto T., 4,017,410.
Bassani Ticino S.p.A.: *See*—
Ranzanigo, Pierluigi, 4,017,817.
Bates, Emile Bernard. Control of the linear speed of the web. 4,017,036, Cl. 242-75.500.
Bates, Victor T.; Fry, Stanley S.; and Hakko, James B., to Fansteel Inc. Tantalum metal powder. 4,017,302, Cl. 75-.5BB.
Batoux, Bernard; Laurent-Atthalin, Albert; and Salmon, Michel, to Metaux Speciaux S.A. Process for continuous production of pure sodium. 4,017,306, Cl. 75-66.000.
Batscheider, Alfred; and Bernasek, Jiri, to Batscheider, Alfred. Method and arrangement for the natural vitaminizing of grain. 4,016,656, Cl. 34-12.000.
Battelle Memorial Institute: *See*—
Erskine, William; Gerber, Raymond; and Mentienne, Francis, 4,017,312.
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Bauer, Dieter: *See*—
Tax, Hans; and Bauer, Dieter, 4,016,993.
Baum, Charles S., to Permanence Corporation. High density composite structure of hard metallic material in a matrix. 4,017,480, Cl. 428-601.000.
Baumann, Ludwig G. Safeguarded switching device. 4,017,771, Cl. 361-357.000.
Bayer Aktiengesellschaft: *See*—
Arend, Gunter; Schaffner, Heinz; and Schramm, Jurgen, 4,017,564.
Brack, Alfred; and Psaar, Hubertus, 4,017,484.
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Krock, Friedrich Wilhelm; and Neeff, Rutger, 4,017,524.
Leusner, Bernd W.; and Schulz, Hans-Hermann, 4,016,650.
Lorenz, Walter; Hammann, Ingeborg; and Stendel, Wilhelm, 4,017,609.
Miessen, Ralf; Blankenstein, Gunter; Korte, Siegfried; and Suling, Carlhans, 4,017,561.
Rohe, Lothar; Schramm, Jurgen; Klauke, Erich; Eue, Ludwig; and Schmidt, Robert Rudolf, 4,017,300.
Sinn, Gustav; and Matner, Martin, 4,017,651.
Straub, Otto-Christian, 4,017,359.
Bazhenov, Sergei Nikolaevich; and Belyavsky, Efim Mordukhovich. Impulse current generator for electroerosion machining of metals. 4,017,705, Cl. 219-69.00C.
BBC Brown Boveri & Company Limited: *See*—
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Beadle, Howard C.; and Brooks, Lester A., to R. T. Vanderbilt Company, Inc. Vulcanization of neoprene. 4,017,439, Cl. 260-79.50B.
Bearden, Roby, Jr.: *See*—
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Becker, Robert W.: *See*—
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Beecham Group Limited: *See*—
Cantello, Barry Christian Charles; Buckle, Derek Richard; and Smith, Harry, 4,017,639.
Beguin, Rene; and Monti, Roland, to Sublistatic Holding S.A. Machine for color reprography, intended for producing color separations of an original. 4,017,176, Cl. 355-32.000.
Belinsky, Sidney I. Hoisting device for a crane. 4,017,109, Cl. 294-67.0AA.
Belknap Corporation: *See*—
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Bell, David W.: *See*—
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Bell, John Kenneth Alexander; and Fuller, John Rodney Dyson, to Rolls-Royce (1971) Limited. Gas turbine engine. 4,017,207, Cl. 415-115.000.
Bell, Robert C.: *See*—
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Burford, Thomas Maynard; and Westerman, George Raymond, 4,017,847.
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French, William George; and MacChesney, John Burnette, 4,017,288.
Jaconetty, George Richard; and Palmquist, Steven Robert, 4,017,695.

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Bengtsson, Berndt Harry; and Bremmer, Sten Anders Harald, to Svedala-Arbra AB. Overload preventing devices in crushers. 4,016,630, Cl. 241-207.000.
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Benoit, Michel; and Gerlach, Pierre, to Thomson-CSF. Parasitic oscillation suppressor for electronic tubes. 4,017,760, Cl. 315-39.000.
Benoit, Roland; and Duprey, Richard H., to InterRoyal Corporation. Balanced bumper means for furniture. 4,016,613, Cl. 5-317.00R.
Benson, Rudolph T., Jr.: *See*—
Andrews, Theodore E.; Weller, John J.; and Benson, Rudolph T., Jr., 4,017,234.
Berens, Heinrich; and Fule, Stefan, to P.I.V. Antrieb Werner Reimers Kommanditgesellschaft. Mounting for a cone pulley transmission. 4,016,771, Cl. 74-230.17M.
Berger, Bruce H., Jr.: *See*—
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Bergwerksverband GmbH: *See*—
Gappa, Gunther; Juntgen, Harald; and Klein, Jurgen, 4,017,422.
Beriger, Ernst; and Pinter, Ladislaus, to Ciba-Geigy AG. Control of insects with 3-hydroxymethacrylic acid methyl ester dimethylthionophosphate. 4,017,611, Cl. 424-212.000.
Beriger, Ernst; Boger, Manfred; Drabek, Jozef; and Kristiansen, Odd, to Ciba-Geigy Corporation. Combatting insects and acarids with certain O-methyl/ethyl-S-propyl/butyl-O-phenyl-thiophosphate and -dithiophosphates. 4,017,612, Cl. 424-219.000.
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Bertland, Alexander U.; Tytell, Alfred A.; Lampson, George P.; and Buynak, Eugene, to Merck & Co., Inc. Method for purifying hepatitis B antigen. 4,017,360, Cl. 195-1.400.
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Beynon, John O., to Ceiling and Drywall Products Limited. Controlled expansion suspended ceiling grid member. 4,016,701, Cl. 52-735.000.
Bible, Harley V., to Robertshaw Controls Company. Control system and improved pneumatically operated temperature controlled valve construction therefor or the like. 4,016,853, Cl. 123-198.00R.
Bible, Harley V.; and Moon, William T., Jr., to Robertshaw Controls Company. Condition responsive valve construction. 4,017,054, Cl. 251-61.400.
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Bjork, Jan; and Holmgren, Kjell Ake Bertil, to Aktiebolaget Thulinverken. Depth charge igniter. 4,016,815, Cl. 102-7.000.
Black, Alvin P. Water treatment system. 4,017,391, Cl. 210-44.000.
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Moores, Robert Gordon, Jr.; and Walton, Richard Eugene, II, 4,016,685.
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Black, Robert M., to Airmag Surveys, Inc. Method and apparatus for measuring variations in magnetic field orientations. 4,017,791, Cl. 324-43.00R.
Black, Stanley A.; and Jenkins, James F., to United States of America, Navy. Powdered metal source for production of heat and hydrogen gas. 4,017,414, Cl. 252-188.000.
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Blake, June Arlene, executrix: *See*—
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Blake, Ralph Kingsley, deceased (by Blake, June Arlene, executrix), to Du Pont de Nemours, E. I., and Company. Use of crown compounds (cyclic polyethers) in litho developers to improve halftone dot quality and gradation. 4,017,314, Cl. 96-66.00R.
Blake, Richard E. Plastic holder for safety matches. 4,016,973, Cl. 206-107.000.
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Blanding, Douglass L., to Eastman Kodak Company. Magnetic tape guide having a tapered roller and an adjustable contoured edge. 4,017,897, Cl. 360-85.000.
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Bloem, Bert, to Lummus Company, The. Deoxygenation of water. 4,017,276, Cl. 55-51.000.
Bloemers, James L., to Brunswick Corporation. Ported cylinder construction for a two-cycle engine. 4,016,850, Cl. 123-193.00C.
Blomstedt, Hans Carl Magnus, to Interoc Fasad Aktiebolag. Structural sheet metal bar member for use in heat insulating building parts. 4,016,700, Cl. 52-735.000.
Blum, Jean. Phenoxy substituted thiolcarboxylic acid amino acid substituted esters. 4,017,530, Cl. 260-455.00R.
Bode, Gerhard Wilhelm: *See*—
Anwer, Jamil; Banchik, Ira Norman; Bode, Gerhard Wilhelm; Lemberg, Werner; and Sud, Kuldip Kumar, 4,017,272.
Bodman, Robert R., to United Technologies Corporation. Turbine rotor construction. 4,017,209, Cl. 416-97.00R.
Boehringer Mannheim G.m.b.H.: *See*—
Bosies, Elmar; Stach, Kurt; Schmidt, Felix Helmut; Heerdt, Ruth; and Weber, Helmut, 4,017,539.
Boeing Company, The: *See*—
Champoux, Louis A.; Falcioni, Joseph G.; and Mendels, Morton, 4,016,703.
Tieden, Jansey D.; and Woodruff, Forester E., Jr., 4,017,831.
Boger, Manfred: *See*—
Beriger, Ernst; Boger, Manfred; Drabek, Jozef; and Kristiansen, Odd, 4,017,612.
Bognolo, Guido: *See*—
Demessemaekers, Emiel Mathilde Anna Alfons; Bognolo, Guido; and Spadini, Gianfranco Luigi, 4,017,409.
Bogoyavlensky, Konstantin Nikolaevich: *See*—
Lapin, Vladimir Viktorovich; Bulgakov, Boris Sergeevich; Bogoyavlensky, Konstantin Nikolaevich; Rozhdestvensky, Jury Lvovich; Granosky, Simon Pavlovich; Maizelis, Genrikh Semenovich; Lazutin, Vladimir Ivanovich; and Sauskan, Ilya Alexandrovich, 4,016,739.
Bohner, Beat; Dawes, Dag; and Meyer, Willy, to Ciba-Geigy Corporation. 1-p-Alkylphenyl-1-p-(alkoxyphenyl)-2-nitroalkanes. 4,017,640, Cl. 424-340.000.
Boldt, Melvin H.; Chuboff, David P.; and Becker, Robert W., to Zenith Radio Corporation. Television receiver cabinet with formed decorative front. 4,017,129, Cl. 312-7.0TV.

Boliden Aktiebolag: *See—*
Lindstrom, Nils Folke Rune, 4,017,369.
Peterson, Stig Arvid; and Lundquist, Sven Anders, 4,017,308.

Bolie, Victor W. Vertical axis windmill. 4,017,205, Cl. 415-2.000.

Bollinger, Ralph Louis, Jr.: *See—*
Baird, William Chalmers, Jr.; Bearden, Roby, Jr.; and Bollinger, Ralph Louis, Jr., 4,017,381.

Bomboire, Rene F., to Eurofloor S.A. Composite textured products and their manufacture. 4,017,658, Cl. 428-172.000.

Bonnefoy-Claudet, Jean-Paul; Martin, Michel; and Tournier, Edmond, to Commissariat a l'Energie Atomique. Method of processing a signal, and corresponding devices. 4,017,812, Cl. 333-70.00A.

Bonnell, William S.; Christman, Robert D.; Lasher, Jordan S.; Paraskos, John A.; and Yanik, Stephen J., to Gulf Research & Development Company. Hydrodesulfurization process with upstaged reactor zones. 4,017,382, Cl. 208-210.000.

Bonnet born Roux, Jacqueline Suzanne: *See—*
Thuillier born Nachmias, Germaine; Laforest born Boutillier du Retail, Jacqueline Suzanne; Cariou, Bernard Jean Marie; Bessin, Pierre Alfred Rene; Bonnet born Roux, Jacqueline Suzanne; and Thuillier, Jean Eugene, 4,017,632.

Bonzom, Albert Julus Lucien: *See—*
Fauveau, Christian Pierre Maurice; Bonzom, Albert Julus Lucien; and Moutard nee Andre, Anne Marie Eugenie, 4,017,378.

Boomer, Virginia M. Trash bag caddy. 4,017,092, Cl. 280-47.260.

Booth, Bruce Lee, to Du Pont de Nemours, E. I., and Company. Spatial frequency carrier and process of preparing same. 4,017,158, Cl. 350-162.0SF.

Booth, Vernard S., to Olinkraft, Inc. Paperboard container. 4,017,019, Cl. 229-39.00R.

Borg, Veine Bernt: *See—*
Soukup, Franz; Larsson, Tore Ingvar; and Borg, Veine Bernt, 4,017,247.

Borg-Warner Corporation: *See—*
Davidson, Hugh McDermand, 4,017,756.

Born, Ellis H.; and Thurston, David L., to Abex Corporation. Control system for variable displacement pumps. 4,017,219, Cl. 417-216.000.

Bosche, Horst Guenter; Baer, Karl; and Schneider, Kurt, to BASF Aktiengesellschaft. Catalyst for the manufacture of triethylenediamine. 4,017,494, Cl. 260-268.00T.

Bosies, Elmar; Stach, Kurt; Schmidt, Felix Helmut; Heerdt, Ruth; and Weber, Helmut, to Boehringer Mannheim G.m.b.H. Biguanide compounds and anti-diabetic compositions. 4,017,539, Cl. 260-564.00B.

Boudreaux, Gordon J.: *See—*
Bailey, August V.; Boudreaux, Gordon J.; Sumrell, Gene; and Novak, Arthur F., 4,017,522.

Bowie, Betty Anne; and Pagano, Joseph F., to SmithKline Corporation. Stable oxidase reagent solutions. 4,017,420, Cl. 252-408.000.

Bowley, Wallace W., to Intech, Inc. Defoamer apparatus. 4,017,279, Cl. 55-178.000.

Boyens, Virgil C. Pipeline and leak locater and method. 4,016,748, Cl. 73-40.50R.

Boynton, Robert James: *See—*
Baraff, David Robbin; Boynton, Robert James; and Westwood, William Dickson, 4,017,712.

Brack, Alfred; and Psaar, Hubertus, to Bayer Aktiengesellschaft. Cationic dyestuffs. 4,017,484, Cl. 260-240.00R.

Bradley, Robert Wayne. Energy engine number two. 4,016,767, Cl. 74-25.000.

Bradley, William Jack, to Procter & Gamble Company, The. Bleaching composition. 4,017,412, Cl. 252-186.000.

Bradshaw, Janice: *See—*
Cook, Martin C.; Gregory, Gordon I.; and Bradshaw, Janice, 4,017,515.

Braker, Frederick William; Heckman, Russell William; Nickey, George Allen; and Potter, Terry Clair, to Owens-Illinois, Inc. Method of controlling shrinkage of a sleeve wrap on a container. 4,016,706, Cl. 53-14.000.

Brand, Jay J., to PPG Industries, Inc. Flow dividing mechanism for a conveyor system. 4,016,969, Cl. 198-435.000.

Brandao, Ruy L.; and Taylor, Robert A., to Bendix Corporation, The. Radar display system. 4,017,853, Cl. 343-5.0DP.

Brander, James Edward; and Davies, John David, to International Combustion Australia Limited. Tuned vibratory feeders. 4,017,060, Cl. 259-1.00R.

Brandon, Bobby C.: *See—*
DePriest, Donald R.; and Brandon, Bobby C., 4,017,349.

Brannan, Jack D., to United States of America, Navy. Weapon retention device. 4,016,796, Cl. 89-1.806.

Brantigan, John W. Tissue tonometer device for use in measuring gas in body tissue. 4,016,863, Cl. 128-2.00G.

Breault, Richard D., to United Technologies Corporation. Electrodes for electrochemical cells. 4,017,663, Cl. 429-12.000.

Breault, Richard D., to United Technologies Corporation. Silicon carbide electrolyte retaining matrix for fuel cells. 4,017,664, Cl. 429-44.000.

Bremmer, Sten Anders Harald: *See—*
Bengtsson, Berndt Harry; and Bremmer, Sten Anders Harald, 4,016,630.

Breyer, Janice K., to Honeywell Information Systems, Inc. Data entry and recording system having field correct capability. 4,017,838, Cl. 340-172.500.

Bridoux, Edouard: *See—*
Desormiere, Bernard; and Bridoux, Edouard, 4,017,751.

Briggs, George Roland, to RCA Corporation. Dynamic shift register cell. 4,017,741, Cl. 307-221.00C.

Briggs, Robert E., to 'Totes' Incorporated. Method of fabricating and installing the grip of a hand-held implement. 4,016,640, Cl. 29-450.000.

Briggs, William Scott, to Georgia-Pacific Corporation. Coating composition. 4,017,430, Cl. 260-17.500.

Brimhall, Gary C.: *See—*
Fairbanks, John B., Jr.; and Brimhall, Gary C., 4,017,377.

Bristol-Myers Company: *See—*
Lim, Gary; and Hooper, John W., 4,017,497.

British Petroleum Company Limited, The: *See—*
Fauveau, Christian Pierre Maurice; Bonzom, Albert Julus Lucien; and Moutard nee Andre, Anne Marie Eugenie, 4,017,378.

Broadwin, Alan; Weiss, Steven N.; and Enker, Stanley H., to Cavitron Corporation. Neurosonic aspirator and method. 4,016,882, Cl. 128-305.000.

Brock, Reginald L. Severing apparatus for plastic material. 4,017,012, Cl. 225-96.500.

Brodesser, Klaus J. Light flasher system for travel trailers. 4,017,827, Cl. 340-81.00R.

Broding, Robert A., to Standard Oil Company (Indiana). Summer for group recorder. 4,017,833, Cl. 340-15.5TS.

Brogdon, Glenn F., Jr.; and Cosby, Algar H., to C. T. Inc. Quick-release roller attachment for supporting a rope or hose and the like on an aerial ladder. 4,017,047, Cl. 248-55.000.

Brois, Stanley J.; Ryer, Jack; and Winans, Esther, to Exxon Research and Engineering Company. Carboxylate half esters of 1-aza-3,7-dioxabicyclo[3.3.0] oct-5-yl methyl alcohols, their preparation and use as additives for oleaginous compositions. 4,017,406, Cl. 252-51.50A.

Brooks, Lester A.: *See—*
Beadle, Howard C.; and Brooks, Lester A., 4,017,439.

Brooks, Thomas W.: *See—*
Coplan, Myron J.; and Brooks, Thomas W., 4,017,030.

Broussaud, Georges, to Thomson-CSF. Display device for producing polychromatic luminous images. 4,017,893, Cl. 358-59.000.

Brouwers, Alexander P.: *See—*
Karaba, Albert M.; Brouwers, Alexander P.; and Pearsall, Thomas J., 4,016,841.

Brown, Garrett W. Equipment for use with hand held motion picture cameras. 4,017,168, Cl. 352-243.000.

Brown, Gordon W.: *See—*
Roe, Norman P.; and Brown, Gordon W., 4,017,579.

Brown, Lee A. Musical instrument saliva collector. 4,016,794, Cl. 84-397.000.

Brown, Raymond J., to United States of America, Energy Research and Development Administration. Tool setting device. 4,016,784, Cl. 82-2.00R.

Brown, Roger S.; Shepard, Charles L.; and Richard, Laurey J., to United States of America, Agriculture. Fiber blending mechanism. 4,016,629, Cl. 19-243.000.

Brown, Ronald D.; and Stolin, Billy L., to Caterpillar Tractor Co. Method of and means for spacing control of plasma arc torch. 4,017,707, Cl. 219-121.00P.

Brown & Williamson Tobacco Corporation: *See—*
Sexstone, John H., 4,016,830.

Browning, Vernon D.: *See—*
Holden, Homer N.; Hunt, James P.; Browning, Vernon D.; Hoglen, Edward L.; and Kleykamp, Donald L., 4,017,232.

Brownlie, Alan W.: *See—*
Daly, Lewis J.; and Brownlie, Alan W., 4,017,069.

Bruhn, Esben; and Jensen, Finn Hansen, to A/S Weston Toeppefabrik. Process for producing pile fabrics and an apparatus for carrying out the process. 4,017,345, Cl. 156-72.000.

Brumlik, George C., to Ingrip Fasteners Inc. Team lattice fibers. 4,017,659, Cl. 428-397.000.

Bruner, James D., to Sandoz, Inc. Pressure indicators for inflatable cuff-type catheters. 4,016,885, Cl. 128-349.00B.

Brunner, Hans: *See—*
Hartmann, Otto; Brunner, Hans; and Hartmann, Thomas, 4,017,398.

Bruno, Philip. Automatic golf ball teeing apparatus. 4,017,087, Cl. 273-201.000.

Brunswick Corporation: *See—*
Bloemers, James L., 4,016,850.

Brusich, Joseph J. Food processing board. 4,017,063, Cl. 269-302.100.

Bryden, William: *See—*
Hawley, Lee E., 4,017,267.

Buchholz, Rainer, to Jagenberg Werke AG. Bottle labeling system. 4,017,774, Cl. 318-39.000.

Buck, Daniel C.; and Mergerian, Dickron, to Westinghouse Electric Corporation. Spin echo matched filter ECM detector. 4,017,855, Cl. 343-18.00E.

Buckle, Derek Richard: *See—*
Cantello, Barry Christian Charles; Buckle, Derek Richard; and Smith, Harry, 4,017,639.

Budd Company, The: *See—*
Eggert, Walter S., Jr., 4,017,117.

Budecker, Ludwig, to International Telephone and Telegraph Corporation. Flow control valve. 4,016,895, Cl. 137-101.000.

Budrick, Ronald G.; King, Frank T.; Martin, Alfred J.; Nolen, Robert L., Jr.; and Solomon, David E., to KMS Fusion, Inc. Method and apparatus for making uniform pellets for fusion reactors. 4,017,290, Cl. 65-21.000.

Buell, Bennett George; and Loffelman, Frank Fred, to American Cyanamid Company. Cationic alpha-cyano-p-dimethylaminocinnamoyl dyes and paper dyed therewith. 4,017,486, Cl. 260-240.900.

Builders Equipment Co.: *See—*
Thomas, Paul M., 4,016,986.

Bulgakov, Boris Sergeevich: *See—*
Lapin, Vladimir Viktorovich; Bulgakov, Boris Sergeevich; Bogoyavlensky, Konstantin Nikolaevich; Rozhdestvensky, Jury Lvovich; Granosky, Simon Pavlovich; Maizelis, Genrikh Semenovich; Lazutin, Vladimir Ivanovich; and Sauskan, Ilya Alexandrovich, 4,016,739.

Bunge, Konrad, to Bayer Aktiengesellschaft. Two-beam photometer with rotatable graded interference filter. 4,017,191, Cl. 356-188.000.

Burdett, David F.; and Mitchell, Doren, to Bell Telephone Laboratories, Incorporated. High speed multiplex data transmission system. 4,017,799, Cl. 325-55.000.

Burford, Thomas Maynard; and Westerman, George Raymond, to Bell Telephone Laboratories, Incorporated. Luminous indicator with zero standby power. 4,017,847, Cl. 340-336.000.

Burk, Duane L.; and Moore, Huber A., to Caterpillar Tractor Co. Dual-speed setting underspeed system. 4,017,218, Cl. 417-216.000.

Burke Company, The: *See—*
Holt, Jack A.; and Torbet, Philip A., 4,017,115.

Burlington Industries, Inc.: *See—*
James, Forrest T.; and Guy, Stephen L., 4,016,831.
London, Joe F., Jr., 4,016,715.

Burnap, Raymond W. Anesthetic and sedative composition. 4,017,619, Cl. 424-244.000.

Burnside, Ernest. Turn signal wiring replacement harness. 4,017,772, Cl. 361-428.000.

Burnside, Walter M., to Bally Manufacturing Corporation. Matrix transformation pin ball machine with score multiplier option. 4,017,077, Cl. 273-121.00A.

Burroughs Corporation: *See—*
Miller, Donald E., 4,017,759.

Burrows, Leonard H.: *See—*
Smith, Jack R.; and Burrows, Leonard H., 4,016,717.

Bury, Allen J.; and Gruhn, William D., Jr. Connectors with primary and secondary lock structure. 4,017,141, Cl. 339-217.00S.

Butler, Ralph G., to Caterpillar Tractor Co. Infinitely variable orifice for part throttle control. 4,017,215, Cl. 417-216.000.

Butler, Robert J. Push-pull transducer system. 4,016,953, Cl. 181-144.000.

Buxton, Inc.: *See—*
Corey, Donald Wyman, 4,016,605.

Buynak, Eugene: *See—*
Bertland, Alexander U.; Tytell, Alfred A.; Lampson, George P.; and Buynak, Eugene, 4,017,360.

Byler, William H.; and Montagna, Angelo A., to Gulf Research & Development Company. Sequential residue hydrodesulfurization and thermal cracking operations in a common reactor. 4,017,380, Cl. 208-89.000.

Bystedt, Hjalmar Sten Ingemar, to Defibrator AB. Apparatus and method for manufacturing wood pulp by grinding wood block material. 4,017,356, Cl. 162-26.000.

C. T. Inc.: *See—*
Brogdon, Glenn F., Jr.; and Cosby, Alga H., 4,017,047.

Cadeddu, Leonardo, to Benditalia S.p.A. Pressure failure warning device. 4,017,124, Cl. 303-6.00C.

Calabek, Milan: *See—*
Sandera, Josef; Calabek, Milan; Kouril, Oldrich; Cenek, Miroslav; Vanacek, Josef; Malik, Jiri; and Koudelka, Vojtech, 4,017,665.

Cale, Roland E., to Schaefer Equipment Company. Reversible foot for railway hopper car inclined braces. 4,016,691, Cl. 52-298.000.

California Cement Shake Co., Inc.: *See—*
Jakel, Gus R., 4,017,230.

Calle, Jaime; and Griswold, V. Michael, to Honeywell Information Systems, Inc. Input/output multiplexer security system. 4,017,839, Cl. 340-172.500.

Callens, Paul Raymond; Picard, Jean Louis; and Poulet, Alain Jean, to International Business Machines Corporation. Method and devices for inserting additional pattern in, or removing same from, a message. 4,017,688, Cl. 179-15.0AF.

Callery, Patrick Stephen: *See—*
Loberg, Michael Dewey; Callery, Patrick Stephen; and Cooper, Malcolm, 4,017,596.

Callisto: *See—*
Delest, Rene, 4,017,112.

Camenisch, Johann L., to J. Gestle, AG. Maximum density mobile storage system. 4,017,131, Cl. 312-198.000.

Camiener, Gerald W.: *See—*
Hanze, Arthur R.; and Camiener, Gerald W., 4,017,606.

Campbell, Francis J.; and Graham, Douglas J., to United States of America, Navy. Connector hinge for oil containment booms. 4,016,726, Cl. 61-1.00F.

Canada, Her Majesty the Queen in right of, as represented by the Minister of the Environment: *See—*
Foggett, H. Rodney, 4,017,393.

Canon Kabushiki Kaisha: *See—*
Komaba, Shiro; and Goshima, Yoshitomo, 4,017,181.
Komori, Shigehiro; Sakamaki, Hisashi; Hattori, Hiroyuki; Iida, Toshihide; Miyamoto, Koichi; and Umezawa, Kazumi, 4,017,170.
Komori, Shigehiro; Sakamaki, Hisashi; Ariga, Masao; Nitanda, Hiroshi; and Nagasawa, Seigi, 4,017,173.
Tsuji, Sadahiko, 4,017,161.
Yamamichi, Masayoshi, 4,017,875.

Cantello, Barry Christian Charles; Buckle, Derek Richard; and Smith, Harry, to Beecham Group Limited. 2-Hydroxy-3-nitro-1,4-naphthoquinones for the prophylaxis of certain allergies. 4,017,639, Cl. 424-331.000.

Cantor, Abraham; and Winicov, Murray W., to West Laboratories, Inc. Methods for preparing solid iodine carrier mixtures and solid formulations of iodine with iodine carriers. 4,017,407, Cl. 252-106.000.

Capocci, Gerald A., to United States of America, Army. Abrasion resistant, non-discoloring polyurethane foams and method of making. 4,017,428, Cl. 260-2.5AM.

Carbonnel, Henri; and Hamon, Ludovic, to Groupement Atomique Alsacienne Atlantique. Highly porous conductive ceramics and a method for the preparation of same. 4,017,426, Cl. 252-520.000.

Cardus, Francis. Electrically operable apparatus for the application of a treating product. 4,016,617, Cl. 15-4.000.

Carey, James E., to Shell Oil Company. Polyepoxide compositions exhibiting improved physical properties. 4,017,432, Cl. 260-18.0EP.

Carey, Thomas H., to Columbia Research Laboratories, Inc. Vibration probe for detecting the radial displacement of rotating shaft. 4,016,752, Cl. 73-71.000.

Cariou, Bernard Jean Marie: *See—*
Thuillier born Nachmias, Germaine; Laforest born Boutillier du Retail, Jacqueline Suzanne; Cariou, Bernard Jean Marie; Bessin, Pierre Alfred Rene; Bonnet born Roux, Jacqueline Suzanne; and Thuillier, Jean Eugene, 4,017,632.

Carl Zeiss-Stiftung: *See—*
Weber, Klaus; and Trapp, Lothar, 4,017,147.

Carlson, E. Frank, to United States of America, Navy. Finger actuated controller. 4,016,775, Cl. 74-471.0XY.

Carlson, Elwood L.; Gunkler, Albert A.; Miller, Conrad O. M.; and Paalman, H. Hunter, to Dow Chemical Company, The. Production of hot brines from liquid-dominated geothermal wells by gas-lifting. 4,017,120, Cl. 299-5.000.

Carlson, Gordon A.: *See—*
Milam, Joseph E.; and Carlson, Gordon A., 4,017,551.

Carrison, Lynn Cloyd; and Wetzel, Robert George, to General Electric Company. Lubricant packed wire drawing dies. 4,016,736, Cl. 72-41.000.

Carstens, Marion R., to Georgia Tech Research Institute. Vehicle transport pipeline pumping system. 4,017,039, Cl. 243-6.000.

Casanova, John V.: *See—*
Pressman, Gerald L.; and Casanova, John V., 4,016,813.

Case, John M. Letter of credit device. 4,017,101, Cl. 283-57.000.

Casino, Sergio: *See—*
Spector, George; and Casino, Sergio, 4,016,783.

Castel, David; and Suess, Stephen E., to Foundation for Ocean Research. Heater and humidifier for breathing apparatus. 4,016,878, Cl. 128-212.000.

Caterpillar Tractor Co.: *See—*
Brown, Ronald D.; and Stolin, Billy L., 4,017,707.
Burk, Duane L.; and Moore, Huber A., 4,017,218.
Butler, Ralph G., 4,017,215.
Chamberlain, Richard W., 4,016,947.
Clemens, Donald E.; and Haslett, Glenn M., 4,016,772.
Dezelan, Joseph E., 4,017,221.
Easterling, Gene B.; and Strabala, Joseph L., 4,016,936.
Engel, Simon L.; Gale, Preston L.; and Lenzen, Glenn H., Jr., 4,017,708.
Evans, Duane E.; Tabor, Thomas M.; and Tyler, David A., 4,016,716.
Moore, Huber A., 4,017,216.

Cavitron Corporation: *See—*
Broadwin, Alan; Weiss, Steven N.; and Enker, Stanley H., 4,016,882.

Cawley, Reginald E. Patient supporting device. 4,017,118, Cl. 297-284.000.

Cazorla, Jean; and Tillon, Yves, to Roger & Gallet. Process for preparing products for use in aerosol form. 4,017,602, Cl. 424-44.000.

Ceiling and Drywall Products Limited: *See—*
Beynon, John O., 4,016,701.

Celanese Coatings & Specialties Company: *See—*
Panush, Sol, 4,017,448.

Celchovska, Olga: *See—*
Svoboda, Vlastimil; and Celchovska, Olga, 4,017,261.

Cenek, Miroslav: *See—*
Sandera, Josef; Calabek, Milan; Kouril, Oldrich; Cenek, Miroslav; Vanacek, Josef; Malik, Jiri; and Koudelka, Vojtech, 4,017,665.

Central Safety Equipment Co.: *See—*
Gordon, Edmund A., 4,016,904.

Centre de Recherche Industrielle du Quebec: *See—*
Rioux, Jacques E.; Turp, Gerald; and Jacques, Francois, 4,016,881.

Centre European de Recherches Pharmacologiques C.E.R.P.H.A.: *See—*
Thuillier born Nachmias, Germaine; Laforest born Boutillier du Retail, Jacqueline Suzanne; Cariou, Bernard Jean Marie; Bessin, Pierre Alfred Rene; Bonnet born Roux, Jacqueline Suzanne; and Thuillier, Jean Eugene, 4,017,632.

Cereijo, Manuel Ramon; and Dougherty, Timothy Stephen, to Western Electric Company, Inc. Apparatus for monitoring cellular dielectric material. 4,017,228, Cl. 425-71.000.

CERPHA: *See—*
Thuillier, Germaine; and Laforest, Jacqueline. 4,017,618.

Cesca, Sebastiano; Priola, Aldo; and Ferraris, Giuseppe, to Snam Progetti, S.p.A. Process for the preparation of linear alpha-olefin oligomers, subsequent hydrogenation thereof and saturated products thus obtained. 4,017,553, Cl. 260-683.15D.

Chamberlain, Richard W., to Caterpillar Tractor Co. Means for securing axle to frame. 4,016,947, Cl. 180-88.000.

Champagne, Ronald E., to General Instrument Corporation. Delinearization circuit. 4,017,800, Cl. 325-464.000.

Champoux, Louis A.; Falcioni, Joseph G.; and Mendels, Morton, to

Boeing Company, The. Combination of a wedge head pin fastener and overlapped work pieces. 4,016,703, Cl. 403-404.000.

Chandramouli, Pitchaiya: *See—*
Vasishth, Ramesh C.; and Chandramouli, Pitchaiya, 4,017,437.

Chang, Long Fei; and Kontz, Robert F., to Owens-Illinois, Inc. Apparatus for blow molding. 4,017,250, Cl. 425-387.00B.

Channing, Charles E.; and Darrell, George H., to Channing, Charles E. Means and method for placing a golf ball position marker on a putting green and for removal thereof. 4,017,082, Cl. 273-162.00D.

Chapman, Christopher Charles, to United States of America, Energy Research and Development Administration. Method for starting operation of a resistance melter. 4,017,674, Cl. 13-23.000.

Chapman, John J.: *See—*
Baker, William C.; and Chapman, John J., 4,016,759.

Cheeseman, Robert Andrew, to Xerox Corporation. Developer assembly support. 4,017,174, Cl. 355-10.000.

Chemetron Corporation: *See—*
Crompton, Charles Edward; and Kazi, Abdulla M. Z., 4,017,418.

Chemische Werke Huls Aktiengesellschaft: *See—*
Grosse-Wortmann, Hans; Hentschel, Bernhard; Rauth, Peter; Schoenberg, Karl-Heinz; Terwiesch, Bernd; and Winter, Hermann, 4,017,445.
Turck, Ulrich; and Tetzner, Heinz, 4,017,443.

Chemotronics International, Inc.: *See—*
Rice, Warren A.; Vinton, Clarence S.; and Norris, Hugh Richard, 4,017,570.
Rice, Warren A.; Vinton, Clarence S.; and Norris, Hugh Richard, 4,017,571.

Chen, Evan Nai-keung; and Beddall, Edward A., to Warner-Lambert Company. Safety razor. 4,016,648, Cl. 30-47.000.

Chenoweth, Vaughn Charles: *See—*
Sanford, Steve Douglas; Chenoweth, Vaughn Charles; and Faulkner, Duane Harold, 4,017,294.

Cherry, Louis E., to John Zink Company. Curb-duct for roof top air conditioners. 4,016,729, Cl. 62-259.000.

Cheseldine, David M., to Sprague Electric Company. Solid valve-metal capacitor with buried graphite in the particles in the electrolyte. 4,017,773, Cl. 361-433.000.

Chevron Research Company: *See—*
Bacskai, Robert, 4,017,465.
Schneider, Ronald A., 4,017,521.

Chicago Pneumatic Tool Company: *See—*
Spring, Edward F., Sr., 4,016,940.

Chisso Corporation: *See—*
Inukai, Takashi; Sato, Hideo; Sugimori, Shigeru; and Ishibe, Tetsuya, 4,017,416.

Choay S.A.: *See—*
Febvre, Henri Lucien, 4,017,361.

Chodorow, Ingram S., to Placontrol, Inc. Dental floss holder. 4,016,892, Cl. 132-91.000.

Chore-Time Equipment, Inc.: *See—*
Wert, John M., 4,016,970.

Christie, Kenneth Howard; DeWitt, David; and Johnson, William Stanford, to International Business Machines Corporation. Nonvolatile metal nitride oxide semiconductor device. 4,017,888, Cl. 357-54.000.

Christman, Robert D.: *See—*
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Chu, Peter F., to Hewlett-Packard Company. Pulse code modulation recording and/or reproducing system. 4,017,903, Cl. 360-40.000.

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Clark, Stephen Larry; and Thoms, William Charles, to Du Pont de Nemours, E. I., and Company. Self-staking circuit board pin contact. 4,017,142, Cl. 339-220.00T.

Clark, Walter E.; and Thompson, Clarence T., to United States of America, Energy Research and Development Administration. Immobilization of iodine in concrete. 4,017,417, Cl. 252-301.10W.

Claus, Alfons Jozef, to Bell Telephone Laboratories, Incorporated. Antenna assembly producing steerable beam and null. 4,017,867, Cl. 343-854.000.

Claxton, Gerald L., to Up-Right, Inc. Vine-fruit harvesting machine with inclined-tip striker rods. 4,016,711, Cl. 56-330.000.

Cleman, Charles F.; and Gilligan, David E. Anti-pollution device for incinerators and the like. 4,017,280, Cl. 55-255.000.

Clemens, Donald E.; and Haslett, Glenn M., to Caterpillar Tractor Co. Sprocket member configuration. 4,016,772, Cl. 74-243.00R.

Cleveland, Joseph J., to GTE Sylvania Incorporated. Method for producing ceramic cellular structure having high cell density. 4,017,347, Cl. 156-89.000.

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Cline, Melvin N.; Augustine, Robert John; and Westphal, Donald John, to Sunbeam Corporation. Electric pressing iron. 4,016,663, Cl. 38-77.830.

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Joshi, Hargovind Himatlal, 4,017,574.

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Cooke, David A.; and Edison, David M., to Subsea Equipment Associates Limited. Position control system for a subsea vehicle. 4,017,823, Cl. 340-3.00D.
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Diehl, Francis Louvaine; Marsan, Mario Stephen; and Edwards, James Byrd, to Procter & Gamble Company, The. Bleaching articles. 4,017,411, Cl. 252-186.000.
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DiGiulio, David Neil, to Procter & Gamble Company, The. Skin moisturizing compositions containing 2-pyrrolidinone. 4,017,641, Cl. 424-365.000.
Dillinger, Robert B.; and Stone, W. James, to United States of America, Navy. Steerable extraction rocket. 4,017,040, Cl. 244-3.220.
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Dore, Jacky, to Sandoz Ltd. Water-soluble azo dyes having a 2-acetoacetamidofluorenyl coupling component radical. 4,017,478, Cl. 260-158.000.
Doric Foods Corporation: *See—*
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Dorrego, Juan Antonio Castanos, to Fabrica Espanola Magnetos, S.A. Ignition devices for automobiles. 4,016,843, Cl. 123-117.00R.
Doss, James D.; and McCabe, Charles W., to United States of America, Energy Research and Development Administration. Method for localizing heating in tumor tissue. 4,016,886, Cl. 128-422.000.
Doss, Richard C., to Phillips Petroleum Company. Sulfur-curable compositions. 4,017,467, Cl. 260-79.000.
Douds, E. Scott: *See—*
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Wagener, Earl H.; Wessling, Ritchie A.; and Gibbs, Dale S., 4,017,372.
Downing, James Herbert; and Wells, James Enoch, III, to Union Carbide Corporation. Method for making strontium additions to ferrosilicon. 4,017,310, Cl. 75-129.000.
Doyle, Ross L.; and Harrison, Thomas S., to Sterling Drug Inc. Dispensing moist treated towels or tissues. 4,017,002, Cl. 221-63.000.
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Drucker, Howard. Push toy. 4,016,675, Cl. 46-205.000.
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Duncan Electric Company, Inc.: *See—*
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Dutz, Karl-Heinz; and Linke, Adolf, to Krupp-Koppers GmbH. Method and arrangement for gasifying finely divided fluidized solid combustible material. 4,017,269, Cl. 48-86.00R.
Dyas, Keith E., to Cyprus Mines Corporation. Formation and transportation of slurried unconsolidated overburden. 4,017,032, Cl. 241-15.000.
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Earp, Charles W., to International Standard Electric Corporation. Radio navigation beacon. 4,017,860, Cl. 343-106.00D.
Easterling, Gene B.; and Strabala, Joseph L., to Caterpillar Tractor Co. Motor grader having improved guide shoes for circle-mounted implement. 4,016,936, Cl. 172-796.000.
Eastman Kodak Company: *See—*
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Einhorn, Ruediger, to Coats & Clark Inc. Method of forming a push pin article and articles produced by the method. 4,017,048, Cl. 248-216.100.
Eisele, Ignaz; Pfleiderer, Hans; and Preuss, Ekkehard, to Siemens Aktiengesellschaft. Magnetic field sensitive diode and method of making same. 4,017,884, Cl. 357-27.000.
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Ellefson, Clarence L., deceased (by Ellefson, Charlotte Vivian, executrix), to Rusco Industries, Inc. Traffic control apparatus. 4,016,679, Cl. 49-49.000.
Elliott, Vincent R., to Remington Arms Company, Inc. Apparatus for testing flexibility of ammunition link belts. 4,016,757, Cl. 73-167.000.
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Engel, Simon L.; Gale, Preston L.; and Lenzen, Glenn H., Jr., to Caterpillar Tractor Co. Method and apparatus for heat treating an internal bore in a workpiece. 4,017,708, Cl. 219-121.0LM.
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Ericksen, Clarence H. Latching mechanism adaptable for use with stretchable farm gates. 4,016,921, Cl. 160-328.000.
Ericson, Richard, to United States Gypsum Company. Construction unit. 4,016,697, Cl. 52-622.000.
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Erskine, William; Gerber, Raymond; and Mentienne, Francis, to Mitsubishi Plastics Industries, Limited; and Battelle Memorial Institute. Method of manufacturing an article carrying a relief image receptor material comprising exposure and heating steps. 4,017,312, Cl. 96-35.000.
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Evans, Duane E.; Tabor, Thomas M.; and Tyler, David A., to Caterpillar Tractor Co. Gas turbine engine dump valve. 4,016,716, Cl. 60-39.09R.
Evans, Howard M., Jr.; and Trodd, Lawrence F. Computer time clock. 4,017,857, Cl. 346-33.00M.

Evans, Robert Franklin, to Du Pont de Nemours, E. I., and Company. Substrate connector. 4,017,138, Cl. 339-75.0MP.
Evans, Theodore A.; and Watts, William A., to Goodyear Tire & Rubber Company, The. Cured rubber article and method of preparation. 4,017,654, Cl. 428-40.000.
Ewald, Robert F.; and Normos, Norbert, to Seaquist Valve Company, Div. of Pittway Corporation. Child safety closure (Method III). 4,017,009, Cl. 222-402.110.
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Falk, Robert James, to Bell Telephone Laboratories, Incorporated. Initializing circuit. 4,017,696, Cl. 179-175.000.
Falkinger, Willard; and Asberg, Per Anders, to Defibrator Aktiebolag. Conveyor plate for wet sheets or dry sheets. 4,017,246, Cl. 425-338.000.
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Farkas, Walter G.; Hoehn, Willard M.; and Zawadzki, Joseph F., to G. D. Searle & Co. Process for isolation of aspartyl dipeptide esters. 4,017,472, Cl. 260-112.50R.
Farley, Earl T., to Westinghouse Electric Corporation. Speed measurement system for turbine power plant. 4,016,723, Cl. 60-660.000.
Farnbach, William A.; and Small, Charles T., to Hewlett-Packard Company. Synchronization of digital circuits by bus triggering. 4,017,740, Cl. 307-208.000.
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Karrer, Friedrich; and Farooq, Saleem, 4,017,549.
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Farrant, David John Rowland, to Automotive Products Company Limited. Ball joint with wear indicator means. 4,017,197, Cl. 403-27.000.
Farrington, Grant M.; Harris, J. Donald; and Foessel, Alfred H., to General Refractories Company. Pitch water soluble resin and alkyd resin as binder composition for refractory particles. 4,017,433, Cl. 260-17.500.
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Fauveau, Christian Pierre Maurice; Bonzom, Albert Julus Lucien; and Moutard nee Andre, Anne Marie Eugenie, to British Petroleum Company Limited, The. Binders for electrodes. 4,017,378, Cl. 208-41.000.
Febvre, Henri Lucien, to Choay S.A. Process for obtaining continuous lines of tumoral cells in vitro. 4,017,361, Cl. 195-1.800.
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Fein, Michael E.; and Salisbury, Charles W., to Owens-Illinois, Inc. Gas laser with sputter-resistant cathode. 4,017,808, Cl. 331-94.50T.
Felice, Fortunato, to Solari & C. Udine S.p.A. Position-control mechanism for stepwise rotating members. 4,017,851, Cl. 340-379.000.
Felix, Ernst; and Locher, Hans, to Zellweger, Ltd. Regulation of electronically operated quality control equipment. 4,016,790, Cl. 83-371.000.
Felter, John V. Automatic damper. 4,017,026, Cl. 236-93.00R.
Fenton, Donald M.; and Vaell, Raoul P., to Union Oil Company of California. Reducing the consumption of anthraquinone disulfonate in Stretford solutions using thiocyanate ion precursors. 4,017,594, Cl. 423-573.00R.
Ferment, George R.; and Skinner, David B., to GAF Corporation. Textured polyurethane surface. 4,017,493, Cl. 427-257.000.
Ferrari, Rodolfo; and Dell'Acqua, Ernani, to SPA-Societa Prodotti Antibiotici S.p.A. Water-soluble pharmaceutical complexes of partricin or an alkyl ester thereof with sodium desoxycholate or sodium dehydrocholate. 4,017,603, Cl. 424-122.000.
Ferrarin, Francesco, to Societa' Italiana Materiali Pressati Resinati e Simili - S.I.M.P.R.E.S. - S.r.l. Stored electronic device for producing pulses having predetermined rate and sequence. 4,017,802, Cl. 328-130.000.
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Fiarman, Irwin S.: *See*—
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Fickes, Ellwood Donald, to General Electric Company. Apparatus for controlling repetitive cutting cycles on a work piece being cut by a cutting tool of a lathe. 4,017,723, Cl. 235-151.110.
Fiedler, Bernhard, to Maschinenfabrik Buckau R. Wolf Aktiengesellschaft. Centrifuge arrangement and method of making a conical container therefor. 4,017,022, Cl. 233-1.00R.
Fiegel, Josef, to International Standard Electric Corporation. Reversible shaded pole motor and control arrangement therefor. 4,017,776, Cl. 318-208.000.
Fife, Merrill E.; and Pell, James W., Jr., to Bendix Corporation, The. Acceleration-insensitive hydrophone. 4,017,824, Cl. 340-10.000.
Figgins, Richard W.: *See*—
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Finger, Eugene P., to Curtis Instruments, Inc. Apparatus for measuring battery depletion by monitoring reductions in voltage. 4,017,724, Cl. 235-151.310.
Finn, Charles A.; and Duckworth, Albert. Clipboard incorporating weapon. 4,016,666, Cl. 42-1.00J.
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Fiorenza, Joseph J., Sr.; and Kalikow, Irving, to Fiorenza, Joseph J. Power-driven fingernail file. 4,016,890, Cl. 132-75.600.
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Fischel, Halbert. Blood leak detector comparing intensities of high absorption band and low absorption band of a single beam of light passing through a sample. 4,017,190, Cl. 356-178.000.
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Fiss, Edward C. Apparatus for recapturing lost energy in a thermoelectric generating plant. 4,016,725, Cl. 60-690.000.
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Foley, Kevin M.; McCombs, Frank P.; and Vigo, Francesco M., to Owens-Corning Fiberglas Corporation. PVC foams. 4,017,657, Cl. 428-95.000.
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Forbes, John P. Side spring door action. 4,016,667, Cl. 42-6.000.
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Frank, Carl A. Nozzle outlet in the stretchable flexible wall for a container. 4,017,020, Cl. 229-62.000.
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Frazer, John S., to Plastipak Packaging. Liquid container. 4,016,995, Cl. 215-10.000.
Frazier, Gerald Joseph, to Frazier Gun Co. Firing mechanism for firearm. 4,016,668, Cl. 42-69.00R.
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Fredricks, Richard N. Cervical-vaginal spatula. 4,016,865, Cl. 128-002.00B.
Freed, Jacob B.; and Reiling, Victor G., to Union Pump Company. Method of lining a plug valve. 4,017,576, Cl. 264-91.000.
Freedman, Bernard; and Diamond, Martin J., to United States of America, Agriculture. Photodegradable polyolefins containing an haloalkyl disulfide. 4,017,666, Cl. 526-3.000.
Freedman, Bernard; and Diamond, Martin J., to United States of America, Agriculture. Photodegradable polyolefin composition containing an N-halo benzenesulphonamide. 4,017,667, Cl. 526-3.000.
Freedman, Bernard; and Diamond, Martin J., to United States of America, Agriculture. Photodegradable polyolefin composition containing an halogenated isocyanuric acid. 4,017,668, Cl. 526-6.000.
Freeman, Ardee H.; and Berger, Bruce H., Jr., to Wheelabrator-Frye, Inc. Pneumatic bypass system for air wash separators. 4,017,384, Cl. 209-149.000.
Freeman, James Harry, to United Kingdom Atomic Energy Authority. Ion beam separators. 4,017,403, Cl. 250-492.00A.
French, William George; and MacChesney, John Burnette, to Bell Telephone Laboratories, Incorporated. Method for making optical fibers with helical gradations in composition. 4,017,288, Cl. 65-2.000.
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Friedlander, Erich Siegfried, to Associated Electrical Industries Limited. Alternating current power transmission systems. 4,017,790, Cl. 323-110.000.
Froschle, Gerhard, to Cross Europa-Werk GmbH. Indexing drive for transfer lines. 4,016,769, Cl. 74-37.000.
Fry, Stanley S.: *See—*
Bates, Victor T.; Fry, Stanley S.; and Hakko, James B., 4,017,302.
Fryer, Rodney Ian: *See—*
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Fuchs, Hugo: *See—*
Gath, Rudolph Hans; and Fuchs, Hugo, 4,017,482.
Fuchs, Julius Jakob, to Du Pont de Nemours, E. I., and Company. Herbicidal allophanimidates. 4,017,529, Cl. 260-453.00R.
Fujii, Kenji: *See—*
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Fujimoto, Rokuro: *See—*
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Fujio, Masaaki. Method and apparatus for encapsulating container with tubular wrapping member. 4,016,704, Cl. 53-3.000.
Fujio, Yoshiharu: *See—*
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Fujita, Teruo: *See—*
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Fujiwara, Shinobu; and Tanaka, Hitoshi, to TDK Electronics Company, Limited. Ceramic dielectric composition. 4,017,320, Cl. 106-73.300.
Fukai, Masakazu: *See—*
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Fukase, Hiroshi: *See—*
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Fukunaga, Motoaki: *See—*
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Fule, Stefan: *See—*
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Fuller, John Rodney Dyson: *See—*
Bell, John Kenneth Alexander; and Fuller, John Rodney Dyson, 4,017,207.
Fults, Elmer H. Water soluble liquid iodine concentrate, aqueous iodine bacteriocidal solution and methods of making the same. 4,017,408, Cl. 252-106.000.
Funk, Erwin D.; and Sherman, Michael I., to Kamyr, Inc. Coal gasification process with improved procedures for continuously feeding lump coal under pressure. 4,017,270, Cl. 48-197.00R.
Furnari, Anthony. Work handling apparatus. 4,016,989, Cl. 214-38.00R.
Fushimi, Hisakazu: *See—*
Tanaka, Minoru; Nakamura, Akihisa; and Fushimi, Hisakazu, 4,016,844.
G. D. Searle & Co.: *See—*
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Davies, David Allen Lewis, 4,017,471.
Farkas, Walter G.; Hoehn, Willard M.; and Zawadzki, Joseph F., 4,017,472.
Jokay, Louis, 4,017,644.
Gaeddert, Melvin Victor; and McWhirt, Bobby Dwayne, to Hesston Corporation. Machine for forming high density round bales. 4,016,712, Cl. 56-341.000.
GAF Corporation: *See—*
Ferment, George R.; and Skinner, David B., 4,017,493.
Galas, Jacques; and Marie, Daniel, to Automobiles Peugeot; and Regie Nationale des Usines Renault. Synchronized gearboxes having at least one non-synchronized speed. 4,016,773, Cl. 74-333.000.
Gale, Preston L.: *See—*
Engel, Simon L.; Gale, Preston L.; and Lenzen, Glenn H., Jr., 4,017,708.
Galstaun, Lionel S., to Bechtel Associates Professional Corporation. Process for the methanation of gases containing high concentration of carbon monoxide. 4,017,274, Cl. 48-214.00A.
Gannon, Charles R., to Ashland Oil, Inc. Pitch-aluminum pigment composition. 4,017,323, Cl. 106-281.00R.
Gant, Orland J., Jr.: *See—*
Howell, Eddie P.; and Gant, Orland J., Jr., 4,017,731.
Gappa, Gunther; Juntgen, Harald; and Klein, Jurgen, to Bergwerksverband GmbH. Method and apparatus for regenerating absorption particles. 4,017,422, Cl. 252-417.000.
Garching Instrumente Gesellschaft zur industriellen Nutzung von Forschungsergebnissen m.b.H.: *See—*
Muller, Peter, 4,017,781.
Garcia, Mario; and Bell, Robert C., to Dictaphone Corporation. Telephone call-diverter system. 4,017,692, Cl. 179-81.00R.
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Gates, Robert B. Step ladder with paint carrier apparatus. 4,016,955, Cl. 182-122.000.
Gath, Rudolph Hans; and Fuchs, Hugo, to BASF Aktiengesellschaft. Method of purifying caprolactam. 4,017,482, Cl. 260-239.30A.
Gauri, Kailash Kumar, to Robugen GmbH, Pharmazeutische Fabrik. Fungicidally active uracil derivatives. 4,017,626, Cl. 424-251.000.
Gehman, David R.; and Fiarman, Irwin S., to Rohm and Haas Company. Polishing method. 4,017,662, Cl. 428-443.000.
Gehrig, Robert G.; and Goetz, George W., to Eaton Corporation. Fluid supply, filter pack used therein and method of assembly. 4,017,100, Cl. 280-736.000.
Geisler, Robert L.; Crelier, Arnold M.; and Roberto, Francisco Q., to United States of America, Air Force. Method for improving metal combustion in solid rocket propellants. 4,017,342, Cl. 149-5.000.
Gemrich, Edwin G., II: *See—*
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Carrison, Lynn Cloyd; and Wetzel, Robert George, 4,016,736.
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Darrow, Kenneth A., 4,017,210.
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Gerrity, Robert John; Wandrey, Clarence Dwight; and Dolbin, Benjamin Howard, deceased (by Rossi, Arlene M. Dolbin, executor), to Lear Siegler, Inc. Altitude control system for drones. 4,017,718, Cl. 235-150.200.
Gibbs, Dale S.; Wagener, Earl H.; and Wessling, Ritchie A., to Dow Chemical Company, The. Structured-particle latexes. 4,017,442, Cl. 260-29.6RB.
Gibbs, Dale S.: *See—*
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Gifford, William E., to Cryox Corporation. Air distillation apparatus comprising regenerator means for producing oxygen. 4,017,284, Cl. 62-40.000.
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Gilbert, Donald Edmond, to Powell Electrical Manufacturing Company. Two wire command and monitoring system. 4,017,832, Cl. 340-147.0LP.
Gilissen, Hermanus Petrus Johannes, to AMP Incorporated. Method of forming a matrix connector. 4,016,647, Cl. 29-629.000.
Gill, Peter John, to GKN Screws & Fasteners Limited. Self-drilling screws. 4,016,795, Cl. 85-41.000.
Gillery, Frank H., to PPG Industries, Inc. Electrically conductive transparent laminated window. 4,017,661, Cl. 428-412.000.
Gilley, E. Gene. Hydrocarbon fuel containing dispersed hydrogen and method of use thereof. 4,017,268, Cl. 44-52.000.
Gilligan, David E.: *See—*
Cleman, Charles F.; and Gilligan, David E., 4,017,280.
Gilligan, Patrick J.: *See—*
Pone, John, Jr.; Schrupp, Kenneth B.; Gilligan, Patrick J.; Harvey, Ronald B.; and Jensen, Gerald A., 4,017,179.
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Enters, Edward W., 4,016,770.
Giudicelli, Don Pierre Rene Lucien; Najer, Henry; Manoury, Philippe Michel Jacques; and Dumas, Andre Pierre Fernand, to Synthelabo. Esters of 2-[(4-quinolyl)amino]-benzoic acids in analgesic and anti-inflammatory compositions. 4,017,623, Cl. 424-250.000.
GKN Screws & Fasteners Limited: *See—*
Gill, Peter John, 4,016,795.
Glaeser, Hans Hellmut, to Du Pont de Nemours, E. I., and Company. Process for selectively chlorinating the titanium content of titaniferous materials. 4,017,304, Cl. 75-33.000.
Glass, Alexander J., to United States of America, Energy Research and Development Administration. Angle amplifying optics using plane and ellipsoidal reflectors. 4,017,163, Cl. 350-294.000.
Glasser, Wolfgang Gerhard; and Hsu, Oscar Hsien-Hsiang, to Research Corporation. Polyurethane intermediates and products and methods of producing same from lignin. 4,017,474, Cl. 260-124.00A.
Glaxo Laboratories Limited: *See—*
Cook, Martin C.; Gregory, Gordon I.; and Bradshaw, Janice, 4,017,515.
Gliemeroth, Georg; and Meckel, Lothar, to Jenaer Glaswerk Schott & Gen. Process for the treatment of glass by metal migration. 4,017,291, Cl. 65-30.00R.
Globe-Union Inc.: *See—*
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Glory Kogyo Kabushiki Kaisha: *See—*
Onoe, Katsuhiko; Abe, Masahiro; and Tamura, Masashi, 4,017,004.
Shigemori, Hideto; and Fukunaga, Motoaki, 4,017,830.
Gminder, Rolf, to Mauser-Jagdwaffen GmbH. Firearm having trigger blocking mechanism. 4,016,669, Cl. 42-70.00A.
Goetz, George W.: *See—*
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Goldberg, Monroe B.; and Voorhis, William B., to General Instrument Corporation. Process for making a brazed lead electrode, and product thereof. 4,017,266, Cl. 428-600.000.
Goldfarb, Adolph E.; and Benkoe, Erwin. Air table handball game apparatus. 4,017,078, Cl. 273-126.00A.
Gomez, Eloy A.; and Levin, Howard J., to American Home Products Corporation. Parenteral benzodiazepine compositions. 4,017,616, Cl. 424-244.000.
Gondo, Hisashi; Takechi, Hiroshi; Kawano, Tsuyoshi; Masui, Hiroaki; and Kovama, Kazuo, to Nippon Steel Corporation. Method and an apparatus for the manufacture of a steel sheet. 4,016,740, Cl. 72-128.000.
Good, Jeremy Andrew: *See—*
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Gorbunov, Eduard Matveevich: *See—*
Puchko, Alexandr Vladimirovich; Klushin, Valery Alexandrovich; Andreev, Georgy Vasilievich; Gorbunov, Eduard Matveevich; Makushok, Evgeny Markellovich; Schukin, Valery Yakovlevich; and Segal, Vladimir Mironovich, 4,016,738.
Gordienne, Jean; and Dousse, Georges, to Creusot-Loire. Bladed rotor. 4,017,212, Cl. 416-198.00A.
Gordon, Edmund A., to Central Safety Equipment Co. Safety vent valve. 4,016,904, Cl. 137-493.900.
Gordon, John Edson; and Ralston, Robert A., to American Cyanamid Company. Process for preparing pyridinium chloride salts of alkyl esters of 2-chloro-N-2-hydroxyethylacetamide. 4,017,501, Cl. 260-295.00Q.
Gordon, Paul, to Strategic Medical Research Corporation. Therapeutic composition and method of therapeutically treating warm blooded animals therewith. 4,017,608, Cl. 424-180.000.
Gordy, Robert S.; Anderson, Alfred T.; and Sanders, David E., to NCR Corporation. Spread spectrum demodulator. 4,017,798, Cl. 325-42.000.
Goshima, Yoshitomo: *See—*
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Green Cross Corporation, The: *See—*
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Green, John Charles; and Wheeler, Ronald Edward. Combination bulk tobacco rack loader and unloader and method of unloading a bulk tobacco rack. 4,016,985, Cl. 214-5.500.
Green, Philip S., to Stanford Research Institute. Ultrasonic imaging method and apparatus. 4,016,750, Cl. 73-67.50R.
Greenwood, Ruth: *See—*
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Gregory, Gordon I.: *See—*
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Greskovich, Charles D.; and Prochazka, Svante, to General Electric Company. Si_3N_4 formed by nitridation of sintered silicon compact containing boron. 4,017,319, Cl. 106-55.000.
Gretag Aktiengesellschaft: *See—*
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Griffith, Edwin; and Stickley, Edward S., to Krause Milling Company. Art of dry milling sorghum and other cereal grains. 4,017,034, Cl. 241-74.000.

Griffith, T. W.; and Taylor, Arthur T., to Gardner-Denver Company. Angular adjustment for drill rig mast. 4,016,687, Cl. 52-116.000.

Grindheim, Earl A., to Rosemount Inc. Two wire current transmitter responsive to a resistive temperature sensor input signal. 4,016,763, Cl. 73-362.0AR.

Griswold, V. Michael: *See—*
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Gross, James R., to Dow Chemical Company, The. Absorbent articles and methods for their preparation. 4,017,653, Cl. 427-385.00A.

Grosse-Wortmann, Hans; Hentschel, Bernhard; Rauth, Peter; Schoenberg, Karl-Heinz; Terwiesch, Bernd; and Winter, Hermann, to Chemische Werke Huls Aktiengesellschaft. Process for the removal of vinyl chloride from polyvinyl chloride dispersions. 4,017,445, Cl. 260-29.60R.

Grostick, Martin Coiner; and Hayes, Thomas Edward, to Johnson Controls, Inc. Stack damper control arrangement. 4,017,024, Cl. 236-16.000.

Groupement Atomique Alsacienne Atlantique: *See—*
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Gruber, Gerald W., to PPG Industries, Inc. Photocatalyst system and ultraviolet light curable coating compositions containing the same. 4,017,652, Cl. 427-54.000.

Gruber, Robert J., to Xerox Corporation. Photoelectrophoretic imaging suspension. 4,017,311, Cl. 96-1.500.

Gruhn, William D., Jr.: *See—*
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GTE Automatic Electric Laboratories Incorporated: *See—*
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Guillermin, Rene; Joly, Jean; and Sangalli, Sylvio, to Rhone-Poulenc-Textile. Apparatus for simultaneously texturizing and cutting continuous yarns. 4,016,626, Cl. 19-.460.

Guimarin, Henry L. Adjustable ratchet wrench. 4,016,782, Cl. 81-63.000.

Gulf Oil Corporation: *See—*
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Gustafsson, Sven-Goran; Larsson, Hans Gunnar; Lilja, Kjell; Lundback, Bertil; Nilsson, Jan; and Syvakari, Pertti, to Allmanna Svenska Elektriska Aktiebolaget. High pressure press. 4,016,737, Cl. 72-60.000.

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H. S. Mason Pty. Limited: *See—*
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Haas, Rainer, to Hans Hollmuller, Maschinenbau, Firma. Method of and apparatus for etching. 4,017,343, Cl. 156-642.000.

Habeger, Larry E., to United States of America, Health, Education and Welfare. Apparatus for low temperature ashing using radio frequency excited gas plasma. 4,017,404, Cl. 250-531.000.

Habicht, Ernst; and Kuhnis, Hans, to Ciba-Geigy Corporation. Certain 1,4-dihydro-3-sulfinyl or sulfonyl-pyridines. 4,017,629, Cl. 424-266.000.

Hackstein, Karl-Gerhard: *See—*
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Haferkorn, Herbert, to Veba-Chemie AG. Production of maleic anhydride by azeotropic dehydration of maleic acid solutions derived from benzene oxidation processes. 4,017,520, Cl. 260-346.80M.

Haffer, Gregor: *See—*
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Haga, Takahiro: *See—*
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Hagemeyer, Hugh J., Jr.: *See—*
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Hagiwara, Teruo, to Asahi Kogaku Kogyo Kabushiki Kaisha. Bayonet mount adapter for a camera. 4,017,878, Cl. 354-286.000.

Haines, Fred E. Printed circuit board circuit tester. 4,017,793, Cl. 324-73.0PC.

Hajos, Gyorgy: *See—*
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Hakko, James B.: *See—*
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Hall, Charles M.; and Wright, John B., to Upjohn Company, The. Alkyl thio sulfinyl and sulfonyl oxamic compounds, compositions and methods of use. 4,017,538, Cl. 260-518.00R.

Hall, George H. Epoxy bond diamond saw. 4,016,857, Cl. 125-21.000.

Hamabe, Takafumi: *See—*
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Hamblin, Richard David, to Archibald Kenrick and Sons Limited. Window stay. 4,017,108, Cl. 292-262.000.

Hamer, Martin; and Batzer, Othmer F., to International Minerals & Chemical Corporation. Organic peroxides as slime settling agents. 4,017,392, Cl. 210-54.000.

Hamilton Communications, Inc.: *See—*
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Hammann, Ingeborg: *See—*
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Hammer, Clarence Frederick; and Sinclair, Harold King, to Du Pont de Nemours, E. I., and Company. Novel elastomeric graft copolymers. 4,017,557, Cl. 260-857.00G.

Hammer, Ilse M. Nipple closure for fluid container. 4,016,975, Cl. 206-390.000.

Hammer, Robert N.: *See—*
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Hammond Corporation: *See—*
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Hamon, Ludovic: *See—*
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Hanchett, Leland. Electric door strike. 4,017,107, Cl. 292-341.160.

Hanke, Albert Robert, to Du Pont de Nemours, E. I., and Company. Process for preparing pigmentary quinacridone in predetermined crystal form. 4,017,496, Cl. 260-279.0QA.

Hankovszky, Olga: *See—*
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Hanning, Robert, to Societa Internazionale per lo Sfruttamento di Brevetti S.A. Apparatus for the production of synthetic-resin bodies having core and skin of different density. 4,017,225, Cl. 425-4.00R.

Hans Hollmuller, Maschinenbau, Firma: *See—*
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Hanson, Jerry D., to Structural Concepts Corporation. Display case. 4,017,130, Cl. 312-128.000.

Hanze, Arthur R.; and Camiener, Gerald W., to Upjohn Company, The. Organic compounds and process. 4,017,606, Cl. 424-180.000.

Hapeman, Martin Jay; and Turley, Barry Jay, to General Electric Company. Lifting force responsive load control for electrically propelled earthmoving vehicles. 4,017,739, Cl. 290-14.000.

Hara, Hirohito; and Shimamura, Hironori, to Nippon Electronics Memory Industry Co. Ltd. Switching regulator having a load responsive alternate biasing circuit. 4,017,787, Cl. 321-45.00S.

Hara, Satoshi: *See—*
Tsukamoto, Hiroyuki; Akino, Morio; Hara, Satoshi; Kikuchi, Kazuyoshi, deceased; Kon, Yumiko, representative; and Kon, Jun, representative, 4,017,904.

Harada, Seiki: *See—*
Tomono, Masami; Abe, Akira; Harada, Seiki; Sato, Kikuji; Takagi, Takeshi; Kamoshita, Genichi; Oya, Yuichiro; and Saiki, Atsushi, 4,017,886.

Hardison, Jack E.: *See—*
Reed, Dale H.; and Hardison, Jack E., 4,016,952.

Hardtmann, Goetz E.; and Coppola, Gary M., to Sandoz, Inc. 6H(1)-Benzopyrano(3,2-c)quinolines. 4,017,499, Cl. 260-289.00C.

Hardy, Peter D., to Metal Box Company Limited, The. Conveyor systems. 4,016,788, Cl. 83-72.000.

Harger, Richard W.: *See—*
Hartger, Richard W.; and Figgins, Richard W., 4,016,686.

Harmon, Larry R.; and Simon, Donald J., to General Electric Company. Microwave oven including apparatus for varying power level. 4,017,702, Cl. 219-10.55B.

Harrington, Phil R.: *See—*
Schild, Kasimir W.; Fleming, Richard D.; and Harrington, Phil R., 4,017,840.

Harris, J. Donald: *See—*
Farrington, Grant M.; Harris, J. Donald; and Foessel, Alfred H., 4,017,433.

Harrison, Thomas S.: *See—*
Doyle, Ross L.; and Harrison, Thomas S., 4,017,002.

Hart, Richard N.: *See—*
Aubrecht, Richard A.; and Hart, Richard N., 4,017,706.

Hartger, Harold V.: *See—*
Hartger, Richard W.; and Figgins, Richard W., 4,016,686.

Hartger, Richard W.; and Figgins, Richard W., to Harger, Richard W.; and Hartger, Harold V. Storage enclosure for small vehicles. 4,016,686, Cl. 52-65.000.

Hartman, Clyde E., to United States of America, Army. Elimination of crosstalk in two sequentially operated Darlington amplifier channels. 4,017,743, Cl. 307-237.000.

Hartmann, Otto; Brunner, Hans; and Hartmann, Thomas, to Hamako Hartmann, Firma. Device for the continuous separation of mixtures of solids and fluids. 4,017,398, Cl. 210-350.000.

Hartmann, Thomas: *See—*
Hartmann, Otto; Brunner, Hans; and Hartmann, Thomas, 4,017,398.

Harty, M. Fillmore, to Dow Chemical Company, The. Sofa bed and mechanism therefor. 4,016,611, Cl. 5-13.000.

Hartzler, Franklin R.; and Wechsler, Michael V., to United States of America, Navy. Device for minimizing interchannel crosstalk in high rate commutator multiplexers. 4,017,687, Cl. 179-15.00A.

Hartzler, Harris Dale, to Du Pont de Nemours, E. I., and Company. Photosensitive composition containing a leuco dye, a photosensitizer, an aromatic aldehyde and a secondary or tertiary amine and the use thereof in a direct-print process. 4,017,313, Cl. 96-48.0QP.

Harvey, Ronald B.: *See—*
Pone, John, Jr.; Schrupp, Kenneth B.; Gilligan, Patrick J.; Harvey, Ronald B.; and Jensen, Gerald A., 4,017,179.

Haschke, Heinz: *See—*
Bittner, Friedrich; Haschke, Heinz; Suchsland, Helmut; Schreyer, Gerd; and Schwarze, Werner, 4,017,413.

Hasegawa, Toru; Hatano, Kazunori; Fukase, Hiroshi; and Iwasaki, Hidesuke, to Takeda Chemical Industries, Ltd. 7-Methoxycephalosporin derivatives. 4,017,485, Cl. 260-240.00J.

Haslett, Glenn M.: *See—*
Clemens, Donald E.; and Haslett, Glenn M., 4,016,772.

Hass, Wynn M., to Southwire Company; and National Steel Corporation. Anode vibrator and press. 4,017,569, Cl. 264-40.200.

Hatano, Kazunori: *See—*
Hasegawa, Toru; Hatano, Kazunori; Fukase, Hiroshi; and Iwasaki, Hidesuke, 4,017,485.

Hatton, Derald R.; and Lehman, Donald F., to Black Clawson Company, The. Screening apparatus. 4,017,387, Cl. 209-240.000.

Hattori, Hiroyuki: *See—*
Komori, Shigehiro; Sakamaki, Hisashi; Hattori, Hiroyuki; Iida, Toshihide; Miyamoto, Koichi; and Umezawa, Kazumi, 4,017,170.

Hattori, Katsuji: *See—*
Moriyama, Akio; Fukai, Masakazu; and Hattori, Katsuji, 4,017,156.

Hauni-Werke Korber & Co., KG: *See—*
Komossa, Werner; Neustadt, Werner; and Tolasch, Gerhard, 4,016,971.

Hauser, Hans; and Cline, Devin R., to J. B. Foote Foundry Co., The. Safety system for lawn mowers. 4,016,709, Cl. 56-10.200.

Hawk, Robert M.; and Racki, Jerome G., to Corning Glass Works. Multiple fiber end preparation. 4,017,013, Cl. 225-96.500.

Hawley, Lee E., to Hawley, Ronald; Enkkeli, Melvin; Clark, Daniel M.; Bryden, William; Adams, Arthur; Hillison, Dennis; Hillison, Mrs. Dennis; Hillison, Irving; and Hillison, Mrs. Irving, part interest to each. Method of die construction using joint structure. 4,017,267, Cl. 29-407.000.

Hawley, Ronald: *See—*
Hawley, Lee E., 4,017,267.

Hayashi, Hideo: *See—*
Kiyota, Takashi; Araki, Yoshihiko; and Hayashi, Hideo, 4,017,355.

Hayes, Thomas Edward: *See—*
Grostick, Martin Coiner; and Hayes, Thomas Edward, 4,017,024.

Hazemag Dr. E. Andreas KG: *See—*
Stuttmann, Jurgen, 4,017,035.

Heath, James E.; and Sawyer, Webster M., to Shell Oil Company. Method and apparatus for continuously separating emulsions. 4,017,389, Cl. 210-23 R.

Hecke, Paul: *See—*
Lenz, Werner; Woellhaf, Josef; Spreng, Klaus; Zuerger, Manfred; Hecke, Paul; Hoffmann, Gerhard; and Obradovic, Milan, 4,017,183.

Heckenkamp, Edward B., to Allis-Chalmers Corporation. Universal dust cover for a hydraulic coupling socket. 4,016,908, Cl. 138-96.00R.

Heckman, Russell William: *See—*
Braker, Frederick William; Heckman, Russell William; Nickey, George Allen; and Potter, Terry Clair, 4,016,706.

Heerdt, Ruth: *See—*
Bosies, Elmar; Stach, Kurt; Schmidt, Felix Helmut; Heerdt, Ruth; and Weber, Helmut, 4,017,539.

Heeres, Jan: *See—*
Janssen, Paul Adriaan Jan; Heeres, Jan; and Hermans, Hubert Karel Frans, 4,017,631.

Hegar, Gert; and Riat, Henri, to Ciba-Geigy AG. 3-Halogeno-6-hydroxy-pyridone-(2) azo dyestuffs. 4,017,477, Cl. 260-153.000.

Hegel, Robert W.; West, Burke A.; and Verb, Robert H., to Monroe Auto Equipment Company. Vehicle leveling system. 4,017,099, Cl. 280-707.000.

Heian, Glenn A., to Allis-Chalmers Corporation. Pan agglomeration with mechanical pellet classification. 4,017,264, Cl. 23-313.00R.

Heiland, Gerhard; and Kohl, Claus Dieter, to Dragerwerk Aktiengesellschaft. Device for determining and/or measuring alcohol content in a gas and method of manufacturing a semi-conductor body for use in alcohol detection. 4,017,792, Cl. 324-71.0SN.

Heilman, William J.; Peterson, Frank C.; Renz, Mical C.; and Theard, Leslie P., to Gulf Oil Corporation. Homogeneous polyepoxide-polyanhydride compositions. 4,017,453, Cl. 260-42.180.

Heino, Richard N., to Lakso Company, Incorporated, The. Article dispensing machine. 4,017,003, Cl. 221-81.000.

Heisig, Charles P.: *See—*
Plate, John R.; and Heisig, Charles P., 4,016,949.

Hellman, Robert R., to Westport Development & Mfg. Co., Inc. Dual acting snap switch. 4,017,699, Cl. 200-67.00D.

Helm, Herbert W., to F. L. Smithe Machine Company, Inc. Drive for rotatable cutter mechanisms. 4,016,789, Cl. 83-355.000.

Helmberger, Josef; and Stadler, Klaus, to AGFA-Gevaert, A.G. Method and equipment for line-by-line recording of color component images on a reproduction carrier. 4,017,891, Cl. 358-6.000.

Hemfort, Heinrich, to Westphalia Separator Aktiengesellschaft. Self-cleaning air-tight centrifugal separator. 4,017,023, Cl. 233-1.00A.

Henderson, James R., to Controls Southeast, Inc. Jacket construction for pipe coupling. 4,017,102, Cl. 285-41.000.

Henderson, Timothy M.; and Wuttke, Gilbert H., to KMS Fusion, Inc. Variable leak gas source. 4,016,743, Cl. 73-1.00R.

Henning, Klaus: *See—*
Dietzsch, Gunter; Frers, Gerd; Henning, Klaus; and Lux, Helmut, 4,016,964.

Henriksen, Dale L.: *See—*
MacKay, Donald B.; Nielson, Brian C.; Henriksen, Dale L.; Billings, Roger Evan; Simons, Harold M.; and Hindmarsh, Paul P., 4,016,836.

Henry, John W.: *See—*
Tharp, Nelson B.; Henry, John W.; and Leydorf, George F., 4,017,863.

Hensley, Roy A. Water screen. 4,017,394, Cl. 210-157.000.

Hentsch, Wolfgang: *See—*
Doge, Klaus; Manig, Gerd; Hentsch, Wolfgang; and Mucke, Johannes, 4,017,206.

Hentschel, Bernhard: *See—*
Grosse-Wortmann, Hans; Hentschel, Bernhard; Rauth, Peter; Schoenberg, Karl-Heinz; Terwiesch, Bernd; and Winter, Hermann, 4,017,445.

Hercules Incorporated: *See—*
Aldrich, Paul Harwood, 4,017,431.

Hermann Finckh Metalltuch-und Maschinenfabrik, Firma: *See—*
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Hermans, Hubert Karel Frans: *See—*
Janssen, Paul Adriaan Jan; Heeres, Jan; and Hermans, Hubert Karel Frans, 4,017,631.

Hernandez, Turney John, to Du Pont de Nemours, E. I., and Company. Phosphonates for control of bindweed. 4,017,296, Cl. 71-86.000.

Hernandez, Turney John, to Du Pont de Nemours, E. I., and Company. Phosphonates for the control of bindweed. 4,017,297, Cl. 71-86.000.

Herubel, Jean Frederic, to N. Schlumberger & Cie. Needle bar securing means on chain gill machines. 4,016,627, Cl. 19-127.000.

Hesston Corporation: *See—*
Gaeddert, Melvin Victor; and McWhirt, Bobby Dwayne, 4,016,712.

Hewlett-Packard Company: *See—*
Chu, Peter F., 4,017,903.
Farnbach, William A.; and Small, Charles T., 4,017,740.
Hunsinger, Dan M., 4,017,804.
Riedel, Ronald J., 4,017,801.
West, William J., 4,017,700.

Heyer, David E., to Du Pont de Nemours, E. I., and Company. Production of a flat thermoplastic film by passing the film over a bearing having a lubricating fluid on the surface thereof. 4,017,575, Cl. 264-89.000.

Hickman, Ronald Price, to Inventec International Limited. Foldable ladder. 4,016,954, Cl. 182-22.000.

Hicks, Chester F. Supporting, aligning and coupling device for pipes. 4,017,046, Cl. 248-55.000.

Hideg, Kalman; Hankovszky, Olga; Palosi, Eva; Hajos, Gyorgy; and Szporny, Laszlo, to Richter Gedeon Vegyeszeti Gyar Rt. 2,3-Dihydro-7-chlorothiazolo[3,2-a]benzimidazole and salt. 4,017,507, Cl. 260-306.70T.

Higgins, James Francis, to Du Pont de Nemours, E. I., and Company. Lead chromate pigment with improved thermal stability. 4,017,328, Cl. 106-298.000.

Hildt, Earl H. Hanger stacker fixture. 4,016,981, Cl. 211-49.00R.

Hilleman, Maurice R.; Miller, William J.; and Provost, Philip J., to Merck & Co., Inc. Hepatitis A antigen. 4,017,601, Cl. 424-89.000.

Hillison, Dennis: *See—*
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Hillison, Irving: *See—*
Hawley, Lee E., 4,017,267.

Hillison, Mrs. Dennis: *See—*
Hawley, Lee E., 4,017,267.

Hillison, Mrs. Irving: *See—*
Hawley, Lee E., 4,017,267.

Hilton, H. Ronald. Training device for pole vaulters. 4,017,070, Cl. 272-104.000.

Hindmarsh, Paul P.: *See—*
MacKay, Donald B.; Nielson, Brian C.; Henriksen, Dale L.; Billings, Roger Evan; Simons, Harold M.; and Hindmarsh, Paul P., 4,016,836.

Hinson, James L.: *See—*
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Hirabayashi, Masaya: *See—*
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Hirai, Hirotomo: *See—*
Yagi, Kenjiro; Koike, Yuji; and Hirai, Hirotomo, 4,017,155.

Hiraoka, Tetsuo; and Sugimura, Yukio, to Sankyo Company Limited. Process for preparing 7β-acylamino-7α-alkoxycephalosporins. 4,017,488, Cl. 260-243.00C.

Hirata, Yasuo: *See—*
Kurihara, Hiroshi; Ogawa, Akira; and Hirata, Yasuo, 4,017,684.

Hirvasoja, Risto: *See—*
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Hitachi, Ltd.: *See—*
Ito, Kazuhiro; Ono, Yuichi; Ueyanagi, Kiichi; Morioka, Makoto; and Kawamura, Masao, 4,016,829.
Mimata, Tsutomu, 4,016,855.
Ono, Yuichi; Kurata, Kazuhiro; Kawamura, Masao; Morioka, Makoto; and Ito, Kazuhiro, 4,017,881.
Seki, Kunio; Suzuki, Yukio; and Sakamoto, Yoshio, 4,017,749.
Suzuki, Takaya; Mimura, Akio; Yagyu, Seturo; and Okuhara, Shinji, 4,017,341.

Tomono, Masami; Abe, Akira; Harada, Seiki; Sato, Kikuji; Takagi, Takeshi; Kamoshita, Genichi; Oya, Yuichiro; and Saiki, Atsushi, 4,017,886.

Ho, Irving T.; and Riseman, Jacob, to International Business Machines Corporation. Single-electrode charge-coupled random access memory cell with impurity implanted gate region. 4,017,883, Cl. 357-24.000.

Ho, Paul Siu-Chung: *See—*
Howard, James Kent; and Ho, Paul Siu-Chung, 4,017,890.

Hochiki Corporation: *See—*
Ishii, Kanji; and Sato, Haruyoshi, 4,017,733.

Hoda, Syed N., to Corning Glass Works. Opal glasses prepared through clay vitrification. 4,017,289, Cl. 65-18.000.

Hodgson, Robert A.; and Gravis, Charles K., to Maloney-Crawford Tank Corporation. Centrifugal separator. 4,017,275, Cl. 55-1.000.

Hodkin, Lester H.; and Hinson, James L. Rotatable dock. 4,016,990, Cl. 214-38.0BB.

Hoechst Aktiengesellschaft: *See—*
Schmidt, Willi Johann, 4,017,227.
Schminke, Wolfgang; Stolting, Klaus; Macholdt, Hans; and Kunkler, Hans, 4,017,671.

Hoehn, Willard M.: *See—*
Farkas, Walter G.; Hoehn, Willard M.; and Zawadzki, Joseph F., 4,017,472.

Hoer, Ralph A.; and Stewart, Michael H., to Ralston Purina Company. Process for producing pH modified protein filaments. 4,017,646, Cl. 426-656.000.

Hoffman, Joseph Adrian, to American Cyanamid Company. Polyolefins and polyesters flame-proofed with carboxyalkyl and carbamoylalkyl substituted poly(phosphine oxides). 4,017,455, Cl. 260-45.70P.

Hoffmann, Gerhard: *See—*
Lenz, Werner; Woellhaf, Josef; Spreng, Klaus; Zuerger, Manfred; Hecke, Paul; Hoffmann, Gerhard; and Obradovic, Milan, 4,017,183.

Hoffmann, Klaus: *See—*
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Hoffmann-La Roche Inc.: *See—*
Derieg, Michael Edward; Earley, James Valentine; Fryer, Rodney Ian; and Sternbach, Leo Henryk, 4,017,531.
Derieg, Michael Edward; Earley, James Valentine; Fryer, Rodney Ian; and Sternbach, Leo Henryk, 4,017,532.
Williams, Joseph James, 4,016,744.

Hofgen, Gunter: *See—*
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Hoglen, Edward L.: *See—*
Holden, Homer N.; Hunt, James P.; Browning, Vernon D.; Hoglen, Edward L.; and Kleykamp, Donald L., 4,017,232.

Holden, Homer N.; Hunt, James P.; Browning, Vernon D.; Hoglen, Edward L.; and Kleykamp, Donald L., to Dayco Corporation. Apparatus for producing a continuous flexible reinforced tubular conduit. 4,017,232, Cl. 425-112.000.

Hollins, Jesse R. Remotely controlled externally mounted motor vehicle mirror. 4,016,776, Cl. 74-501.00M.

Hollis, Clinton R., to International Paper Company. Method for the manufacture of dunnage bag liners. 4,016,805, Cl. 93-35.0VL.

Holm, LeRoy W., to Union Oil Company of California. Soluble oil composition. 4,017,405, Cl. 252-8.55D.

Holmes, Jeffrey W.; Purcell, Bruce K.; Franz, William F.; and Cole, Edward L., to Texaco Inc. Apparatus for sulfuric acid catalyzed alkylation process. 4,017,263, Cl. 23-288.00E.

Holmes & Narver, Inc.: *See—*
Johnson, Paul H., 4,017,309.

Holmgren, Kjell Ake Bertil: *See—*
Bjork, Jan; and Holmgren, Kjell Ake Bertil, 4,016,815.

Holt, Jack A.; and Torbet, Philip A., to Burke Company, The. Lift system for concrete slabs. 4,017,115, Cl. 294-89.000.

Holz, Emil, to Hermann Finckh Metalltuch-und Maschinenfabrik, Firma. Strainer drum and method of making the same. 4,017,401, Cl. 210-493.000.

Honda Giken Kogyo Kabushiki Kaisha: *See—*
Nakano, Soichi; Ohama, Yasumichi; and Watanabe, Masao, 4,016,846.
Tanaka, Minoru; Nakamura, Akihisa; and Fushimi, Hisakazu, 4,016,844.
Yoshioka, Yuichi; and Sanka, Tsugio, 4,016,838.

Honeywell Inc.: *See—*
Jensen, Earl D., 4,017,841.
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Honeywell Information Systems, Inc.: *See—*
Breyer, Janice K., 4,017,838.
Calle, Jaime; and Griswold, V. Michael, 4,017,839.

Honma, Hiroyuki; Yoshimura, Hirofumi; Nishi, Takeshi; and Fujimoto, Rokuro, to Nippon Steel Corporation. Welding material for low temperature steels. 4,017,711, Cl. 219-146.000.

Hooker Chemicals & Plastics Corporation: *See—*
Mose, Luciano; Kramer, Wolfgang; Strewe, Wolfgang; and Strasser, Bernd, 4,017,376.

Hooper, John W.: *See—*
Lim, Gary; and Hooper, John W., 4,017,497.

Hopkins, Byrd, to Monsanto Company. Recycle control system for continuous polymerization. 4,017,498, Cl. 23-285.000.

Hopkins, Melvyn D.; and Wolf, Charles B., to Westinghouse Electric Corporation. Junction box for high voltage gas insulated conductors. 4,017,675, Cl. 174-21.00C.

Hopper, Roger J., to Goodyear Tire & Rubber Company, The. N-chlorothiocarboxylic acid amide/imide-modified terpolymers. 4,017,468, Cl. 260-79.50B.

Horner, Richard F.; and Vander Veen, Jaring, to Bendix Corporation, The. Dual layer heat shield for wheels. 4,017,123, Cl. 301-6.0WB.

Horsma, David August: *See—*
Whitney, Wells; and Horsma, David August, 4,017,715.

Hoshi, Noboru: *See—*
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Ohno, Shigeru; Hoshi, Noboru; and Sekigawa, Fujio, 4,017,647.

Hotine, William. Reversible pump with positive valving. 4,017,220, Cl. 417-273.000.

Houdaille Industries, Inc.: *See—*
Blackwell, Elliott H., 4,017,223.

Howard, James Kent; and Ho, Paul Siu-Chung, to International Business Machines Corporation. Intermetallic compound layer in thin films for improved electromigration resistance. 4,017,890, Cl. 357-67.000.

Howell, Alleyne C., Jr. Rail construction for rail-type electrification systems. 4,016,961, Cl. 191-23.00A.

Howell, Eddie P.; and Gant, Orland J., Jr., to Atlantic Richfield Company. Method and apparatus for prospecting for buried mineral deposits. 4,017,731, Cl. 250-253.000.

Hrovat, Milan; Wolff, Willi; and Hackstein, Karl-Gerhard, to Nukem G.m.b.H. Process for the production of block fuel elements for gas cooled high temperature power reactor. 4,017,567, Cl. 264-.500.

Hsieh, Paul Y.; and Rogall, Eugene W., to Ing. C. Olivetti & C., S.p.A. Thermographic printing method. 4,017,366, Cl. 204-2.000.

Hsu, Oscar Hsien-Hsiang: *See—*
Glasser, Wolfgang Gerhard; and Hsu, Oscar Hsien-Hsiang, 4,017,474.

Hubbard, James R.; and Erdman, Charles A., to Graphic Controls Corporation. Truncated ball pen. 4,017,870, Cl. 346-140.00A.

Hubbard, James R., to Graphic Controls Corporation. Marker with three phase ink circuit. 4,017,871, Cl. 346-140.00R.

Huber, Wolfgang; Saifer, Mark G.; and Williams, Lewis D., to Diagnostic Data, Inc. Acylated orgotein. 4,017,605, Cl. 424-177.000.

Hudson, Donald C.; Morris, Charles R.; Fleck, Horst G.; and Senghaas, Karl A. Conveyer apparatus for medical patients. 4,017,737, Cl. 250-453.000.

Hughes Aircraft Company: *See—*
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Hughes, Francis H.: *See—*
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Hughes, Richard Swart: *See—*
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Hull-Smith Chemicals, Inc.: *See—*
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Hulsey, William J. Recreation vehicle. 4,017,116, Cl. 296-26.000.

Humboldt Products Corporation: *See—*
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Hunsinger, Dan M., to Hewlett-Packard Company. Broad band variable gain amplifier. 4,017,804, Cl. 330-29.000.

Hunt, James P.: *See—*
Holden, Homer N.; Hunt, James P.; Browning, Vernon D.; Hoglen, Edward L.; and Kleykamp, Donald L., 4,017,232.

Hurvitz, Arnold. Decorative grille structure. 4,016,699, Cl. 52-663.000.

Husky Corporation: *See—*
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Husky Injection Molding Systems Inc.: *See—*
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Huston, Henry H.: *See—*
Kalata, Daniel R.; and Huston, Henry H., 4,016,976.

Hutcheson, Lynn D.; and Hughes, Richard Swart, to United States of America, Navy. Electronically controlled digital laser. 4,017,807, Cl. 331-94.50C.

Hyman, Mark, Jr. Scintillator. 4,017,738, Cl. 250-483.000.

I É R Impression Enregistrement des Resultats: *See—*
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I-T-E Imperial Corporation: *See—*
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Ichiyanagi, Katsuaki: *See—*
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Iida, Tetsuya; Saori, Hideo; Inoguchi, Masao; and Tominaga, Hiroo, to Showa Oil Company, Ltd. Conversion process of hydrocarbons. 4,017,379, Cl. 208-68.000.

Iida, Toshihide: *See—*
Komori, Shigehiro; Sakamaki, Hisashi; Hattori, Hiroyuki; Iida, Toshihide; Miyamoto, Koichi; and Umezawa, Kazumi, 4,017,170.

Ikeda, Toshio: *See—*
Akami, Hitoshi; Nishikawa, Shigeru; Ikeda, Toshio; and Tsukokura, Akira, 4,017,894.

Ikegami, Seiiti: *See—*
Osujo, Masahide; Ikegami, Seiiti; Murayama, Yoshinobu; Omura, Takaho; and Morimoto, Tadashi, 4,016,957.

Illig, Edwin J., to Corning Glass Works. Heat treating and sagging lens blanks. 4,017,293, Cl. 65-107.000.

Illinois Tool Works Inc.: *See—*
Mittelmann, Eugene, 4,017,701.
Rayburn, Charles Calvin, 4,017,818.
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Image Analysing Computers Limited: *See—*
Anderson, Robert William; Knowles, William Ralph; and Culley, John Edward, 4,017,680.
Imai, Toshihiro, to Olympus Optical Co., Ltd. Wide-angle illuminating optical system with light guide. 4,017,150, Cl. 350-96.0BC.
IMC Chemical Group, Inc.: *See—*
Eggers, Warren J., 4,017,324.
Imperial Chemical Industries: *See—*
Cobb, Malcolm Carnie, 4,017,255.
Imperial-Eastman Corporation: *See—*
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Ing. C. Olivetti & C., S.p.A.: *See—*
Hsieh, Paul Y.; and Rogall, Eugene W., 4,017,366.
Ingalls, Barbara Salvatore. Educational system alphabet cards. 4,016,660, Cl. 35-71.000.
Ingersoll-Rand Company: *See—*
Ditson, J. D., 4,016,801.
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Ingrip Fasteners Inc.: *See—*
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Inoguchi, Masao: *See—*
Iida, Tetsuya; Saori, Hideo; Inoguchi, Masao; and Tominaga, Hiroo, 4,017,379.
Inou, Kiyoharu: *See—*
Watanabe, Kazutaka; Shimizu, Misao; Ogawa, Toshio; Sugawara, Akihiro; and Inou, Kiyoharu, 4,017,828.
Inoue, Jiro: *See—*
Kakehi, Sasuga; Miyazaki, Jiro; and Inoue, Jiro, 4,017,752.
Inouye, Shigeharo; Omoto, Shoji; Iwamatsu, Katsuyoshi; Tsuruoka, Takashi; Niida, Taro; and Kawasaki, Toyoaki, to Meiji Seika Kaisha, Ltd. 9,3'',4''-Triacyl ester of the antibiotic SF-837 M_1 substance and the production thereof. 4,017,607, Cl. 424-180.000.
Inouye, Sus, to Northrop Corporation. Gun to rudder interconnect system. 4,016,798, Cl. 89-37.50R.
Intech, Inc.: *See—*
Bowley, Wallace W., 4,017,279.
International Business Machines Corporation: *See—*
Callens, Paul Raymond; Picard, Jean Louis; and Poulet, Alain Jean, 4,017,688.
Christie, Kenneth Howard; DeWitt, David; and Johnson, William Stanford, 4,017,888.
Criscimagna, Tony Nick; and Steinmetz, Michael J., 4,017,762.
Ho, Irving T.; and Riseman, Jacob, 4,017,883.
Howard, James Kent; and Ho, Paul Siu-Chung, 4,017,890.
Miller, Lewis F., 4,017,889.
International Combustion Australia Limited: *See—*
Brander, James Edward; and Davies, John David, 4,017,060.
International Minerals & Chemical Corporation: *See—*
Hamer, Martin; and Batzer, Othmer F., 4,017,392.
International Paper Company: *See—*
Hollis, Clinton R., 4,016,805.
International Standard Electric Corporation: *See—*
Earp, Charles W., 4,017,860.
Fiegel, Josef, 4,017,776.
Wimmer, Leopold; Hofgen, Gunter; and Poschadel, Werner, 4,017,861.
International Telephone and Telegraph Corporation: *See—*
Budecker, Ludwig, 4,016,895.
Kao, Charles K., 4,017,149.
International Vibration Engineering: *See—*
Le Pierres, Gildas, 4,016,799.
Interoc Fasad Aktiebolag: *See—*
Blomstedt, Hans Carl Magnus, 4,016,700.
InterRoyal Corporation: *See—*
Benoit, Roland; and Duprey, Richard H., 4,016,613.
Interscan Corporation: *See—*
Shaw, Manuel; and Thatcher, Imbrie, 4,017,373.
Inukai, Takashi; Sato, Hideo; Sugimori, Shigeru; and Ishibe, Tetsuya, to Chisso Corporation. P-cyanophenyl 4-alkyl-4'-biphenylcarboxylate, method for preparing same and liquid crystal compositions using same. 4,017,416, Cl. 252-299.000.
Inventec International Limited: *See—*
Hickman, Ronald Price, 4,016,954.
Ioffe, Leonid Yakovlevich: *See—*
Ryzhkov, Nikolai Stepanovich; Nikolaev, Viktor Petrovich; Krylov, Viktor Alexeevich; Ioffe, Leonid Yakovlevich; Krotov, Veniamin Vasilievich; and Derzhavets, Jury Adolfovich, 4,016,777.
Iota Engineering Inc.: *See—*
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Ishibe, Tetsuya: *See—*
Inukai, Takashi; Sato, Hideo; Sugimori, Shigeru; and Ishibe, Tetsuya, 4,017,416.
Ishida, Nobuhiro; and Saito, Kazuyuki, to Mitsubishi Chemical Industries Ltd.; and Oriental Sangyo Co., Ltd. Pencil lead and manufacturing method of the same. 4,017,451, Cl. 260-38.000.
Ishidoshiro, Hiroshi: *See—*
Sando, Yoshikazu; Ishidoshiro, Hiroshi; and Minakata, Matsuo, 4,017,258.
Ishiguro, Takeo, to Shionogi & Co., Ltd. Miticidal compositions comprising 2-(p-tert.-butylphenoxy)cyclohexyl 2-propynyl sulfite and dibenzyl disulfide. 4,017,635, Cl. 424-303.000.
Ishihara Sangyo Kaisha Ltd.: *See—*
Takahashi, Ryohei; Yokomichi, Isao; Maeda, Kazuyuki; and Haga, Takahiro, 4,017,295.
Ishii, Kanji; and Sato, Haruyoshi, to Hochiki Corporation. Ionization type smoke sensor. 4,017,733, Cl. 250-381.000.
Ishikawa, Katsuji: *See—*
Iwata, Hiroshi; and Ishikawa, Katsuji, 4,017,872.
Ishiwata, Junichi; Suzuki, Hideo; and Sekiguchi, Masakichi, to Kabushiki Kaisha Meidensha. Shaped quartz crystal resonator. 4,017,753, Cl. 310-9.600.
Isowa, Yoshikazu; and Kurita, Hideaki, to Sagami Chemical Research Center. Process for producing N-alkylhydroxylamines. 4,017,512, Cl. 260-326.00N.
Itek Corporation: *See—*
Powers, Robert H., 4,017,877.
Robbins, Daniel H., 4,017,182.
Ito, Kazuhiro; Ono, Yuichi; Ueyanagi, Kiichi; Morioka, Makoto; and Kawamura, Masao, to Hitachi, Ltd. Apparatus for crystal growth. 4,016,829, Cl. 118-64.000.
Ito, Kazuhiro: *See—*
Ono, Yuichi; Kurata, Kazuhiro; Kawamura, Masao; Morioka, Makoto; and Ito, Kazuhiro, 4,017,881.
Ivy, Orval D., to IWN, Inc. Shipping container for perishables. 4,017,016, Cl. 229-23.0BT.
Iwamatsu, Katsuyoshi: *See—*
Inouye, Shigeharo; Omoto, Shoji; Iwamatsu, Katsuyoshi; Tsuruoka, Takashi; Niida, Taro; and Kawasaki, Toyoaki, 4,017,607.
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Iwasaki, Matae: *See—*
Motojima, Kenji; Iwasaki, Matae; Suzuki, Kazuya; Komaki, Yoshihide; and Ichiyanagi, Katsuaki, 4,017,583.
Iwata, Hiroshi; and Ishikawa, Katsuji, to West Electric Company, Ltd. Shutter for camera. 4,017,872, Cl. 354-29.000.
IWN, Inc.: *See—*
Ivy, Orval D., 4,017,016.
Izaka, Ken-ichi; and Takechi, Kazuo, to Green Cross Corporation, The. Method for preparing a heat-stable plasma protein solution from paste IV-1. 4,017,470, Cl. 260-112.00B.
J. B. Foote Foundry Co., The: *See—*
Hauser, Hans; and Cline, Devin R., 4,016,709.
J. E. Love Company: *See—*
May, Donald L.; and Neal, Archie E., 4,016,710.
J. Gestle, AG: *See—*
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J. I. Case Company: *See—*
Kuester, Donald A., 4,016,948.
J. M. Voith GmbH: *See—*
Tra, Josef, 4,017,033.
Jackson, Robert W.: *See—*
Baker, Donald J.; and Jackson, Robert W., 4,016,774.
Jacobson, Darwin J. Airplane parcel ejector. 4,017,042, Cl. 244-137.00R.
Jaconetty, George Richard; and Palmquist, Steven Robert, to Bell Telephone Laboratories, Incorporated. Customer operated gain control circuit. 4,017,695, Cl. 179-170.00R.
Jacques, Francois: *See—*
Rioux, Jacques E.; Turp, Gerald; and Jacques, Francois, 4,016,881.
Jaeschke, Wolfgang: *See—*
Stauff, Joachim; Jaeschke, Wolfgang; and Schlogl, Gunter, 4,017,260.
Jaffe, Donald; and Soos, Nicholas Alec, to Bell Telephone Laboratories, Incorporated. Encapsulation of integrated circuits. 4,017,495, Cl. 264-272.000.
Jagenberg Werke AG: *See—*
Buchholz, Rainer, 4,017,774.
Jahraus, Rudi, to Moriz Hausch GmbH. Writing implement and method of manufacturing the same. 4,017,195, Cl. 401-104.000.
Jakel, Gus R., to California Cement Shake Co., Inc. Means for forming tapered slabs. 4,017,230, Cl. 425-84.000.
James, Forrest T.; and Guy, Stephen L., to Burlington Industries, Inc. Apparatus for applying a foam backing to fabric. 4,016,831, Cl. 118-415.000.
James, Lawrence W., to Varian Associates. Solar cells employing stacked opposite conductivity layers. 4,017,332, Cl. 136-89.0PC.
James, Robert L., to Bendix Corporation, The. Multiple input, multiple failure operational voter circuit. 4,017,742, Cl. 307-357.000.
Jamesbury Corporation: *See—*
Rawstron, William W., 4,016,907.
Janssen, Paul Adriaan Jan; Heeres, Jan; and Hermans, Hubert Karel Frans, to Janssen Pharmaceutica N.V. Imidazolium salts. 4,017,631, Cl. 424-273.000.
Janssen Pharmaceutica N.V.: *See—*
Janssen, Paul Adriaan Jan; Heeres, Jan; and Hermans, Hubert Karel Frans, 4,017,631.
Japan Atomic Energy Research Institute: *See—*
Motojima, Kenji; Iwasaki, Matae; Suzuki, Kazuya; Komaki, Yoshihide; and Ichiyanagi, Katsuaki, 4,017,583.
Japan Inorganic Material Co., Ltd.: *See—*
Kawai, Motochika; and Shimozawa, Izuru, 4,017,322.
Jarboe, Thomas R.; and Baker, William R., to United States of America, Energy Research and Development Administration. Method for producing laser targets. 4,017,578, Cl. 264-143.000.

Jarrett, Boaz Antony; and Seilly, Alec Harry, to Simms Group Research & Development Limited. Actuating devices. 4,017,754, Cl. 310-26.000.

Jefferson, Ray. Disposable biodegradable environmental animal feces waste scoop and container. 4,017,015, Cl. 229-19.000.

Jeffery, Ernest. Golf putting and chipping device. 4,017,084, Cl. 273-176.0FB.

Jenaer Glaswerk Schott & Gen.: *See—*
Gliemeroth, Georg; and Meckel, Lothar, 4,017,291.
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Jenkins, James F.: *See—*
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Jensen, Earl D., to Honeywell Inc. Bus allocation control apparatus. 4,017,841, Cl. 340-172.500.

Jensen, Finn Hansen: *See—*
Bruhn, Esben; and Jensen, Finn Hansen, 4,017,345.

Jensen, Gerald A.: *See—*
Pone, John, Jr.; Schrupp, Kenneth B.; Gilligan, Patrick J.; Harvey, Ronald B.; and Jensen, Gerald A., 4,017,179.

Jensen, Joseph C., to NCR Corporation. Transformer saturation control circuit for a high frequency switching power supply. 4,017,786, Cl. 321-45.00R.

Jensen, Ole Dollerup: *See—*
Aas, Flemming; and Jensen, Ole Dollerup, 4,017,374.

Jensen, Poul Wilfred, to AGA Radiator AB. Boiler with condenser. 4,016,834, Cl. 122-264.000.

Jensen, Thomas H., to PPG Industries, Inc. Control apparatus and system for closely spaced heating elements for forming glass fibers and method of using same. 4,017,287, Cl. 65-2.000.

Jerabek, Robert D.; Marchetti, Joseph R.; and Zwack, Robert R., to PPG Industries, Inc. Ketimine-blocked primary amine group-containing cationic electrodepositable resins. 4,017,438, Cl. 260-29.2EP.

Jerie, Hans Georg, to Stichting Internationaal Instituut voor Lucktkaartering en Aarkunde (ITC). Device mountable in a craft for the recording of data from a remote object. 4,017,145, Cl. 350-7.000.

John Zink Company: *See—*
Cherry, Louis E., 4,016,729.

Johns-Manville Corporation: *See—*
Puchosic, John Edward, 4,016,707.
Sanford, Steve Douglas; Chenoweth, Vaughn Charles; and Faulkner, Duane Harold, 4,017,294.

Johnson Controls, Inc.: *See—*
Grostick, Martin Coiner; and Hayes, Thomas Edward, 4,017,024.

Johnson, Curtis: *See—*
Rozzell, Thomas C.; Johnson, Curtis; Durney, Carl; and Lords, James, 4,016,761.

Johnson, Frederick O., to Westinghouse Electric Corporation. Digital firing pulse generator for thyristor power converters. 4,017,744, Cl. 307-252.00Q.

Johnson, James A. Putter. 4,017,083, Cl. 273-164.000.

Johnson, Marvin M.; and Nowack, Gerhard P., to Phillips Petroleum Company. Hydrocarbon steam reforming and methanation catalysts. 4,017,424, Cl. 252-437.000.

Johnson, Paul H., to Holmes & Narver, Inc. Thin layer leaching method. 4,017,309, Cl. 75-101.00R.

Johnson, Richard C.; and Lee, Kenneth E., to Foster Wheeler Energy Corporation. Closure assembly for a furnace. 4,016,820, Cl. 110-173.00R.

Johnson Service Company: *See—*
Pederson, Carl N.; and Angelopoulos, Peter G., 4,017,683.

Johnson, William Stanford: *See—*
Christie, Kenneth Howard; DeWitt, David; and Johnson, William Stanford, 4,017,888.

Johnston, Otis A.: *See—*
Dick, Charles W.; Johnston, Otis A.; Paitson, John L.; and Savit, Carl H., 4,016,951.

Johnstone, Duncan. Industrial vacuum loader with dust removal means for bag house filtration system. 4,017,281, Cl. 55-334.000.

Jokay, Louis, to G. D. Searle & Co. High calorie food bar. 4,017,644, Cl. 426-540.000.

Joly, Jean: *See—*
Guillermin, Rene; Joly, Jean; and Sangalli, Sylvio, 4,016,626.

Joncas, Armand. Guillotine type animal trap. 4,016,672, Cl. 43-78.000.

Jones, Allen Jacob, to Agnew, S. J. Recirculating furnace-dryer combination. 4,017,254, Cl. 432-72.000.

Jones, C. David: *See—*
Suarez, Tulio; and Jones, C. David, 4,017,546.

Jones, Owen Morris: *See—*
Astley, Edward Pryce; Jones, Owen Morris; and Law, Kenneth William, 4,016,915.

Jones, Peter Hadley; Kyncl, Jaroslav; Ours, Carroll Wayne; and Somani, Pitambar, to Abbott Laboratories. Esters of γ-glutamyl amide of dopamine. 4,017,636, Cl. 424-309.000.

Jons, Claus, to Robert Bosch G.m.b.H. Gear machine with cutouts in the shaft journals. 4,017,224, Cl. 418-131.000.

Jordan, Reinhard; and von Langsdorff, Fritz, to F. von Langsdorff Bauverfahren GmbH. Composite paving structures and laying units therefor. 4,016,692, Cl. 52-314.000.

Joshi, Hargovind Himatlal, to Colgate-Palmolive Company. Process for making variegated soap. 4,017,573, Cl. 264-75.000.

Joshi, Hargovind Himatlal, to Colgate-Palmolive Company. Process for making variegated soap. 4,017,574, Cl. 264-75.000.

Julinot, Helmut. Air pulsed hydroponic unit. 4,016,677, Cl. 47-64.000.

Juntgen, Harald: *See—*
Gappa, Gunther; Juntgen, Harald; and Klein, Jurgen, 4,017,422.

Kabat, John L., to Honeywell Inc. Apparatus for supervising leads interconnecting a plurality of self-contained abnormal condition sensing and alarm annunciating units. 4,017,852, Cl. 340-409.000.

Kabushiki Kaisha Daini Seikosha: *See—*
Yagi, Kenjiro; Koike, Yuji; and Hirai, Hirotomo, 4,017,155.

Kabushiki Kaisha Keihin Seiki Seisakusho: *See—*
Yoshioka, Yuichi; and Sanka, Tsugio, 4,016,838.

Kabushiki Kaisha Komatsu Seisakusho: *See—*
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Kabushiki Kaisha Meidensha: *See—*
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Kabushiki Kaisha Seikosha: *See—*
Kobayashi, Masanori, 4,017,154.

Kadin, Saul B., to Pfizer Inc. Anti-allergic N-(5-tetrazolyl)-1-oxo-1H-6-alkoxypyrimido-[1,2-a]quinoline-2-carboxamides and intermediates therefor. 4,017,625, Cl. 424-251.000.

Kagayama, Jo, to Tsuyama Mfg. Co., Ltd. Bicycle side reflector. 4,017,151, Cl. 350-99.000.

Kakehi, Sasuga; Miyazaki, Jiro; and Inoue, Jiro, to Murata Manufacturing Co., Ltd. Piezoelectric ceramic resonator mounting means. 4,017,752, Cl. 310-9.400.

Kalata, Daniel R.; and Huston, Henry H., to Owens-Illinois, Inc. Nestable containers. 4,016,976, Cl. 206-519.000.

Kalfoglou, George, to Texaco Inc. Surfactant oil recovery method for use in high temperature formations containing water having high salinity and hardness. 4,016,932, Cl. 166-303.000.

Kalikow, Irving: *See—*
Fiorenza, Joseph J., Sr.; and Kalikow, Irving, 4,016,890.

Kammel, Roland: *See—*
Winterhager, Helmut; Kammel, Roland; and Weigel, Horst, 4,017,307.

Kamoshita, Genichi: *See—*
Tomono, Masami; Abe, Akira; Harada, Seiki; Sato, Kikuji; Takagi, Takeshi; Kamoshita, Genichi; Oya, Yuichiro; and Saiki, Atsushi, 4,017,886.

Kamyr, Inc.: *See—*
Funk, Erwin D.; and Sherman, Michael I., 4,017,270.

Kannam, Peter Joseph; and Bennett, Wilfred Potter, to RCA Corporation. Transistor having integrated protection. 4,017,882, Cl. 357-13.000.

Kansai Paint Company, Ltd.: *See—*
Kondo, Taizo; Matsui, Komaharu; and Yamamoto, Kunio, 4,017,435.

Kao, Charles K., to International Telephone and Telegraph Corporation. Multiple access fiber optical bus communication system. 4,017,149, Cl. 350-96.00C.

Kaplan, Gerald Stanley; and Ritzie, Andrew David, to RCA Corporation. Binary rate multiplier with means for spacing output signals. 4,017,719, Cl. 235-150.300.

Karaba, Albert M.; Brouwers, Alexander P.; and Pearsall, Thomas J., to Teledyne Industries, Inc. Variable compression ratio piston. 4,016,841, Cl. 123-78.00B.

Karlsson, Borje E. Apparatus for lubricating saw chains in guide bars. 4,016,956, Cl. 184-15.00R.

Karlsson, Hans Erik Valdemar: *See—*
Larsson, Bengt Hakan; and Karlsson, Hans Erik Valdemar, 4,016,816.

Karlsson, Hans Ingemar Reimertz. Steam engine. 4,016,724, Cl. 60-672.000.

Karlsson, Hugo. Device on apparatus for pressing powder or granules into candles. 4,017,231, Cl. 425-110.000.

Karrer, Friedrich; and Farooq, Saleem, to Ciba-Geigy Corporation. Ether and thioether containing thiolesters. 4,017,536, Cl. 260-470.000.

Karrer, Friedrich; and Farooq, Saleem, to Ciba-Geigy Corporation. Diphenylmethane ether derivatives. 4,017,549, Cl. 260-613.00R.

Kasami, Akinobu; Kawachi, Masaru; and Mineo, Hiroki, to Tokyo Shibaura Electric Co., Ltd. Red light emitting gallium phosphide device. 4,017,880, Cl. 357-17.000.

Kasha, Michael, to Norlin Music, Inc. Bridge for stringed musical instrument. 4,016,793, Cl. 84-307.000.

Katsube, Junki: *See—*
Takashima, Yoshinori; Maruyama, Isamu; and Katsube, Junki, 4,017,621.

Katsurayana, Hiromasa, to Shin-Shirasuna Electric Corporation. Tape recorder cassette ejecting device. 4,017,900, Cl. 360-137.000.

Katzakian, Arthur, Jr.: *See—*
Steele, Roger B.; and Katzakian, Arthur, Jr., 4,017,429.

Kaufmann, Arthur E., to William F. Blake, Inc. Pocket holder for interchangeable worksheets. 4,016,664, Cl. 40-10.00R.

Kaugars, Girts; and Gemrich, Edwin G., II, to Upjohn Company, The. Method of use, composition, and compounds. 4,017,540, Cl. 260-566.00B.

Kaupp, Gunther; and Voltz, Jacques, to Ciba-Geigy AG. Cationic indazole-azo-5-amino pyrazole dyestuffs. 4,017,479, Cl. 260-158.000.

Kawachi, Masaru: *See—*
Kasami, Akinobu; Kawachi, Masaru; and Mineo, Hiroki, 4,017,880.

Kawahara, Haruyuki; and Hirabayashi, Masaya, to Kyoto Ceramic Co., Ltd. Device for implanting an artificial endosseous element of ceramics and an implant method for use of the device. 4,016,651, Cl. 32-10.00A.

Kawai, Motochika; and Shimozawa, Izuru, to Japan Inorganic Material Co., Ltd. Method for reinforcing aqueous hydraulic cement. 4,017,322, Cl. 106-99.000.

Kawamura, Masao: *See—*
Ito, Kazuhiro; Ono, Yuichi; Ueyanagi, Kiichi; Morioka, Makoto; and Kawamura, Masao, 4,016,829.
Ono, Yuichi; Kurata, Kazuhiro; Kawamura, Masao; Morioka, Makoto; and Ito, Kazuhiro, 4,017,881.
Kawano, Tsuyoshi: *See—*
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Kawasaki, Toyoaki: *See—*
Inouye, Shigeharo; Omoto, Shoji; Iwamatsu, Katsuyoshi; Tsuruoka, Takashi; Niida, Taro; and Kawasaki, Toyoaki, 4,017,607.
Kazi, Abdulla M. Z.: *See—*
Crompton, Charles Edward; and Kazi, Abdulla M. Z., 4,017,418.
Keating, Daniel William, to American Optical Corporation. Thermal Recorder. 4,017,868, Cl. 346-61.000.
Kemner, Rudolf; and Marquerinck, Joost Egbert, to U.S. Philips Corporation. Television pick-up and display system suitable for continuous and short-duration information pick-up and for continuous display. 4,017,679, Cl. 358-111.000.
Kemper, Hermanus Christoffel: *See—*
Stubbs, Christopher Edward; Nooi, Jacobus Roelof; and Kemper, Hermanus Christoffel, 4,017,541.
Kendale Industries, Inc.: *See—*
Setele, William O.; and Miller, Donald A., 4,017,128.
Kendall, Don L.; and Matzen, Walter T., to Texas Instruments Incorporated. Large value capacitor. 4,017,885, Cl. 357-51.000.
Kenny, Thomas M., to Ogontz Controls Company. Thermostatic valve. 4,016,901, Cl. 137-340.000.
Kent, Arthur P.; and Marks, Mortimer, to Marks Polarized Corporation. Motion picture film for three dimensional projection. 4,017,166, Cl. 352-57.000.
Kerr, William B.: *See—*
Wielang, Joseph A.; Palmer, William B.; and Kerr, William B., 4,017,253.
Keusgen, Heinz-Everhard; Seeger, Gunter; and Beyer, Reinhard, to Bison-werke Bahre & Greten GmbH & Co. KG. Device for producing chip boards and the like. 4,017,233, Cl. 425-145.000.
Khan, Aman Ullah, to Whirlpool Corporation. Snap fasteners for drop-in assemblies. 4,016,608, Cl. 4-187.00A.
Khardin, Alexandr Pavlovich: *See—*
Gorbunov, Boris Nikolaevich; Efremova, Galina Dmitrievna; Kukartsev, Evgeny Maximovich; Erokhina, Lidia Vladimirovna; Lukashov, Anatoly Ivanovich; Orlyansky, Vitaly Vasilievich; Khardin, Alexandr Pavlovich; Churikova, Ideya Antonovna; and Valdman, Daniil Iosifovich, 4,017,518.
Kiener, Volker: *See—*
Voelkl, Erfried; Schreiner, Siegfried; Wunsch, Gerd; Kiener, Volker; Waibel, Rudi; and Koester, Hartwig, 4,017,593.
Kiestra, Philippus Pope. Apparatus for determining the quantity of milk and for drawing a sample during the milking of cows. 4,016,832, Cl. 119-14.140.
Kikuchi, Kazuyoshi, deceased: *See—*
Tsukamoto, Hiroyuki; Akino, Morio; Hara, Satoshi; Kikuchi, Kazuyoshi, deceased; Kon, Yumiko, representative; and Kon, Jun, representative, 4,017,904.
Kikuchi, Shintaro: *See—*
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Kilcoyne, James Edward: *See—*
Coburn, Theodore Robert; and Kilcoyne, James Edward, 4,017,251.
Kilian, Thomas M.; and Ryan, Mark D., to FMC Corporation. Circuitry for simultaneous transmission of signals and power. 4,017,845, Cl. 340-310.00R.
Killam, H. Scott, to Rohm and Haas Company. Polymers stabilized with polymerizable vinylbenzyltrialkyl ammonium salt surfactant. 4,017,440, Cl. 260-29.6HN.
Kimball, Michael E., to Goodyear Tire & Rubber Company, The. Polytetramethylene ether urethane cured with 2,2'-diaminodiphenyl disulphide. 4,017,464, Cl. 260-77.5AM.
King, Frank T.: *See—*
Budrick, Ronald G.; King, Frank T.; Martin, Alfred J.; Nolen, Robert L., Jr.; and Solomon, David E., 4,017,290.
King, John A., to Essex Group, Inc. Method for making loudspeaker with magnetic fluid enveloping the voice coil. 4,017,694, Cl. 179-115.5VC.
King, Loyd L.; Wheeler, Robert G.; and Fish, Thomas M., to United States of America, Health, Education and Welfare. Uterine caliper and depth gauge. 4,016,867, Cl. 128-2.00S.
Kirchhein, Albert T., to Bendix Corporation, The. Flap compensation system for use when controlling the pitch attitude of an aircraft. 4,017,045, Cl. 244-194.000.
Kirsch, Bernhard. Safety bindings for skis. 4,017,098, Cl. 280-625.000.
Kishi, Takao; and Nozawa, Takamitsu, to Yoshino Kogyosho Co., Ltd. Miniature atomizer of manual type. 4,017,031, Cl. 239-333.000.
Kitamura, Motoshi: *See—*
Nakayama, Toshimasa; and Kitamura, Motoshi, 4,017,365.
Kittler, Milton J. Resilient throttle stop means. 4,016,842, Cl. 123-98.000.
Kiyota, Takashi; Araki, Yoshihiko; and Hayashi, Hideo, to Nippon Oil Company Ltd. Process for treating latices. 4,017,355, Cl. 159-49.000.
Klauke, Erich: *See—*
Rohe, Lothar; Schramm, Jurgen; Klauke, Erich; Eue, Ludwig; and Schmidt, Robert Rudolf, 4,017,300.
Klein, Jurgen, to Accumulatorenwerk Hoppecke Carl Zoellner & Sohn. Device for assembling the storage plates and insulating plates of lead-acid batteries. 4,016,638, Cl. 29-730.000.
Klein, Jurgen: *See—*
Gappa, Gunther; Juntgen, Harald; and Klein, Jurgen, 4,017,422.
Kleykamp, Donald L.: *See—*
Holden, Homer N.; Hunt, James P.; Browning, Vernon D.; Hoglen, Edward L.; and Kleykamp, Donald L., 4,017,232.
Klockner-Humboldt-Deutz Aktiengesellschaft: *See—*
Winterhager, Helmut; Kammel, Roland; and Weigel, Horst, 4,017,307.
Kloster, James R., to Kloster Pattern Company. Circular saw guide. 4,016,649, Cl. 30-373.000.
Kloster Pattern Company: *See—*
Kloster, James R., 4,016,649.
Klushin, Valery Alexandrovich: *See—*
Puchko, Alexandr Vladimirovich; Klushin, Valery Alexandrovich; Andreev, Georgy Vasilievich; Gorbunov, Eduard Matveevich; Makushok, Evgeny Markellovich; Schukin, Valery Yakovlevich; and Segal, Vladimir Mironovich, 4,016,738.
KMS Fusion, Inc.: *See—*
Budrick, Ronald G.; King, Frank T.; Martin, Alfred J.; Nolen, Robert L., Jr.; and Solomon, David E., 4,017,290.
Henderson, Timothy M.; and Wuttke, Gilbert H., 4,016,743.
Nolen, Robert L., Jr.; and Siebert, Larry D., 4,017,164.
Knowles, Robert Gordon, to Litton Systems, Inc. Solderless electrical contact. 4,017,143, Cl. 339-221.00R.
Knowles, William Ralph: *See—*
Anderson, Robert William; Knowles, William Ralph; and Culley, John Edward, 4,017,680.
Kobayashi, Masanori, to Kabushiki Kaisha Seikosha. Display device. 4,017,154, Cl. 350-159.000.
Kobayashi, Tadashi. Golf ball washing machine. 4,016,618, Cl. 15-21.00A.
Kobe Steel Ltd.: *See—*
Okuda, Naoki; and Tanaka, Kazuo, 4,017,339.
Watanabe, Toshihiko; and Maruyama, Tokuji, 4,017,709.
Koch, Erich O., to Robertshaw Controls Company. Motor protection circuit. 4,017,778, Cl. 318-473.000.
Kodama, Takashi: *See—*
Suzui, Akio; Nose, Shinji; Kodama, Takashi; Yokoyama, Kenji; Matsumoto, Kazuya; and Fujio, Yoshiharu, 4,017,434.
Koehler-Dayton, Inc.: *See—*
Davis, Robert B., 4,017,395.
Koester, Eberhard; Wunsch, Gerd; Deigner, Paul; Stumpfl, Werner; and Schneehage, Hans Henning, to BASF Aktiengesellschaft. Manufacture of acicular ferromagnetic metal pigments containing iron. 4,017,303, Cl. 75-.5AA.
Koester, Hartwig: *See—*
Voelkl, Erfried; Schreiner, Siegfried; Wunsch, Gerd; Kiener, Volker; Waibel, Rudi; and Koester, Hartwig, 4,017,593.
Kogel, Gerhard; Degen, Roberto; and Mundwiler, Walter, to Ciba-Geigy Corporation. Process for the printing and pad-dyeing of mixed fabric. 4,017,256, Cl. 8-21.00C.
Kohl, Claus Dieter: *See—*
Heiland, Gerhard; and Kohl, Claus Dieter, 4,017,792.
Koike, Masahiko, to Nippon Gakki Seizo Kabushiki Kaisha. Automatic rhythm playing apparatus. 4,016,791, Cl. 84-1.030.
Koike, Yuji: *See—*
Yagi, Kenjiro; Koike, Yuji; and Hirai, Hirotomo, 4,017,155.
Kokusai Denshin Denwa Kabushiki Kaisha: *See—*
Kurihara, Hiroshi; Ogawa, Akira; and Hirata, Yasuo, 4,017,684.
Kolbach, Charles C., to Scott Paper Company. Method and apparatus for forming absorbent articles. 4,016,628, Cl. 19-148.000.
Kollmorgen Corporation: *See—*
Taylor, William H., 4,017,148.
Komaba, Shiro; and Goshima, Yoshitomo, to Canon Kabushiki Kaisha. Copy medium carrier. 4,017,181, Cl. 355-72.000.
Komaki, Yoshihide: *See—*
Motojima, Kenji; Iwasaki, Matae; Suzuki, Kazuya; Komaki, Yoshihide; and Ichiyanagi, Katsuaki, 4,017,583.
Komori, Shigehiro; Sakamaki, Hisashi; Hattori, Hiroyuki; Iida, Toshihide; Miyamoto, Koichi; and Umezawa, Kazumi, to Canon Kabushiki Kaisha. Electrophotographic device. 4,017,170, Cl. 355-3.00R.
Komori, Shigehiro; Sakamaki, Hisashi; Ariga, Masao; Nitanda, Hiroshi; and Nagasawa, Seigi, to Canon Kabushiki Kaisha. Copying apparatus for copying a plurality of original surfaces with a single scan. 4,017,173, Cl. 355-8.000.
Komossa, Werner; Neustadt, Werner; and Tolasch, Gerhard, to Hauni-Werke Korber & Co., KG. Conveyor for use in tobacco shredding apparatus. 4,016,971, Cl. 198-850.000.
Komura, Masaru; and Arai, Kenichi, to Minolta Camera Kabushiki Kaisha. Copy paper transporting unit for use in electro-photographic copying apparatus. 4,017,169, Cl. 355-3.00R.
Kon, Jun, representative: *See—*
Tsukamoto, Hiroyuki; Akino, Morio; Hara, Satoshi; Kikuchi, Kazuyoshi, deceased; Kon, Yumiko, representative; and Kon, Jun, representative, 4,017,904.
Kon, Yumiko, representative: *See—*
Tsukamoto, Hiroyuki; Akino, Morio; Hara, Satoshi; Kikuchi, Kazuyoshi, deceased; Kon, Yumiko, representative; and Kon, Jun, representative, 4,017,904.
Kondo, Taizo; Matsui, Komaharu; and Yamamoto, Kunio, to Kansai Paint Company, Ltd. Powder coating composition for electrodeposition. 4,017,435, Cl. 260-22.00A.
Konishi, Masami; and Yanagihara, Hiromichi, to Toyota Jidosha Kogyo Kabushiki Kaisha. Apparatus for preventing after-burning in internal combustion engine. 4,016,852, Cl. 123-198.0DB.

Kontz, Robert F.: *See—*
Chang, Long Fei; and Kontz, Robert F., 4,017,250.

Korner, Siegfried, to VEB polygraph Leipzig Kombinat fur Polygraphische Maschinen und Ausrustungen. Method of and apparatus for stamping out sheet material blanks. 4,016,786, Cl. 83-9.000.

Korte, Siegfried: *See—*
Miessen, Ralf; Blankenstein, Gunter; Korte, Siegfried; and Suling, Carlhans, 4,017,561.

Kossoff, George, to Commonwealth of Australia Care of the Department of Health, The. Ultrasonic beam forming technique. 4,016,751, Cl. 73-71.5US.

Kostlin, Heiner: *See—*
Almer, Friedrich Hermann Raymund; and Kostlin, Heiner, 4,017,758.

Kosuge, Yukio: *See—*
Nakada, Hiroshi; and Kosuge, Yukio, 4,016,702.

Koudelka, Vojtech: *See—*
Sandera, Josef; Calabek, Milan; Kouril, Oldrich; Cenek, Miroslav; Vanacek, Josef; Malik, Jiri; and Koudelka, Vojtech, 4,017,665.

Kouril, Oldrich: *See—*
Sandera, Josef; Calabek, Milan; Kouril, Oldrich; Cenek, Miroslav; Vanacek, Josef; Malik, Jiri; and Koudelka, Vojtech, 4,017,665.

Kovaleski, Joseph J. Tension brush for wire spool. 4,017,037, Cl. 242-129.800.

Kovama, Kazuo: *See—*
Gondo, Hisashi; Takechi, Hiroshi; Kawano, Tsuyoshi; Masui, Hiroaki; and Kovama, Kazuo, 4,016,740.

Kozak, Milan F.; Taylor, Mark W.; and Elder, Ronald C., to Monsanto Company. Steel member for reinforcing rubber composites and method of making same. 4,017,338, Cl. 148-12.00B.

Kraft, Derald H.; and St. John, Richard C., to Aspro, Inc. Method of making clutch housing and bearing assembly. 4,016,642, Cl. 29-509.000.

Kramer, Wolfgang: *See—*
Mose, Luciano; Kramer, Wolfgang; Strewe, Wolfgang; and Strasser, Bernd, 4,017,376.

Krause Milling Company: *See—*
Griffith, Edwin; and Stickley, Edward S., 4,017,034.

Krautsack, Richard G., to Cooperative Marketing Co., The. Assemblage with dual support. 4,016,977, Cl. 206-526.000.

Kreikebaum, Gerhard: *See—*
Shofner, Frederick M.; and Kreikebaum, Gerhard, 4,017,186.

Kreiser, C. Fred, to Electro-Therm, Inc. Segmented sacrificial anode attachment to water heating element. 4,017,714, Cl. 219-322.000.

Kristiansen, Odd: *See—*
Beriger, Ernst; Boger, Manfred; Drabek, Jozef; and Kristiansen, Odd, 4,017,612.
Dittrich, Volker; Topfl, Werner; and Kristiansen, Odd, 4,017,638.

Krock, Friedrich Wilhelm; and Neeff, Rutger, to Bayer Aktiengesellschaft. Anthraquinone dyestuffs. 4,017,524, Cl. 260-380.000.

Krommes, Gerd: *See—*
Pan Lei, Peter, 4,016,849.

Krotov, Veniamin Vasilievich: *See—*
Ryzhkov, Nikolai Stepanovich; Nikolaev, Viktor Petrovich; Krylov, Viktor Alexeevich; Ioffe, Leonid Yakovlevich; Krotov, Veniamin Vasilievich; and Derzhavets, Jury Adolfovich, 4,016,777.

Krupp-Koppers GmbH: *See—*
Dutz, Karl-Heinz; and Linke, Adolf, 4,017,269.

Kruse, Robert L.: *See—*
Deets, Gary L.; and Kruse, Robert L., 4,017,559.

Krylov, Viktor Alexeevich: *See—*
Ryzhkov, Nikolai Stepanovich; Nikolaev, Viktor Petrovich; Krylov, Viktor Alexeevich; Ioffe, Leonid Yakovlevich; Krotov, Veniamin Vasilievich; and Derzhavets, Jury Adolfovich, 4,016,777.

Kubota Tekko Co., Ltd.: *See—*
Osujo, Masahide; Ikegami, Seiiti; Murayama, Yoshinobu; Omura, Takaho; and Morimoto, Tadashi, 4,016,957.

Kuester, Donald A., to J. I. Case Company. Dual steering system for vehicle. 4,016,948, Cl. 180-132.000.

Kuhn, Edmund W.; Uber, Jesse L.; and Findley, Joseph D., Jr., to Westinghouse Electric Corporation. Draw-out type circuit interrupter with modular construction. 4,017,698, Cl. 200-50.0AA.

Kuhnis, Hans: *See—*
Habicht, Ernst; and Kuhnis, Hans, 4,017,629.

Kuhnle, Siegfried, to H. Berthold A.G. Photosetter. 4,017,177, Cl. 355-43.000.

Kuipers, Jack, to Polhemus Navigation Sciences, Inc. Apparatus for generating a nutating electromagnetic field. 4,017,858, Cl. 343-100.00R.

Kukartsev, Evgeny Maximovich: *See—*
Gorbunov, Boris Nikolaevich; Efremova, Galina Dmitrievna; Kukartsev, Evgeny Maximovich; Erokhina, Lidia Vladimirovna; Lukashov, Anatoly Ivanovich; Orlyansky, Vitaly Vasilievich; Khardin, Alexandr Pavlovich; Churikova, Ideya Antonovna; and Valdman, Daniil Iosifovich, 4,017,518.

Kulite Semiconductor Products, Inc.: *See—*
Kurtz, Anthony D., 4,016,644.

Kummer, Rudolf, to BASF Aktiengesellschaft. Manufacture of 1,4-butanediol. 4,017,550, Cl. 260-635.00E.

Kunkle, Donald E., to Beloit Corporation. Nip load sensing device. 4,016,756, Cl. 73-141.00A.

Kunkler, Hans: *See—*
Schminke, Wolfgang; Stolting, Klaus; Macholdt, Hans; and Kunkler, Hans, 4,017,671.

Kupperman, Dennis I.: *See—*
Kupperman, Sam; and Kupperman, Dennis I., 4,016,891.

Kupperman, Sam; and Kupperman, Dennis I., to R B Toy Development Co. Dental floss holder for detachable securement to toothbrush handle and the like for supporting a strip of floss in taut condition ready for use. 4,016,891, Cl. 132-84.00A.

Kurata, Kazuhiro: *See—*
Ono, Yuichi; Kurata, Kazuhiro; Kawamura, Masao; Morioka, Makoto; and Ito, Kazuhiro, 4,017,881.

Kurata, Masayuki; and Watanabe, Yusiyo, to Akebono Brake Industry Co., Ltd. Sealing device for hydraulically or pneumatically operated equipment. 4,017,089, Cl. 277-152.000.

Kurihara, Hiroshi; Ogawa, Akira; and Hirata, Yasuo, to Kokusai Denshin Denwa Kabushiki Kaisha. System for determining burst sending timing in TDMA communication. 4,017,684, Cl. 178-69.100.

Kurita, Hideaki: *See—*
Isowa, Yoshikazu; and Kurita, Hideaki, 4,017,512.

Kurtz, Anthony D., to Kulite Semiconductor Products, Inc. Methods of fabricating low pressure silicon transducers. 4,016,644, Cl. 29-583.000.

Kurtz, Lynn C. Electrically operated game apparatus. 4,017,072, Cl. 273-1.00E.

Kusters, Edward: *See—*
Ahrweiler, Karl-Heinz, 4,017,235.

Kuwada, Yutaka; Meguro, Kanji; Tawada, Hiroyuki; Sohda, Takashi; Natsugari, Hideaki; and Sato, Yoshiaki, to Takeda Chemical Industries, Ltd. Thienodiazepine derivatives. 4,017,620, Cl. 424-248.510.

Kuzmin, Anatoly Alexandrovich: *See—*
Paton, Boris Evgenievich; Lakomsky, Viktor Iosifovich; Torkhov, Gennady Fedorovich; Trigub, Vladimir Kirillovich; Sheiko, Ivan Vasilievich; Verkhovtsev, Emil Vasilievich; Bakumenko, Sergei Panteleevich; Ponomarev, Nikolai Alexeevich; and Kuzmin, Anatoly Alexandrovich, 4,017,672.

Kvam, Ole Jacob. Ski bindings. 4,017,097, Cl. 280-615.000.

Kwan-Gett, Clifford S. Atriotomy access device. 4,016,884, Cl. 128-348.000.

Kyncl, Jaroslav: *See—*
Jones, Peter Hadley; Kyncl, Jaroslav; Ours, Carroll Wayne; and Somani, Pitambar, 4,017,636.

Kyoto Ceramic Co., Ltd.: *See—*
Kawahara, Haruyuki; and Hirabayashi, Masaya, 4,016,651.

LaBounty, Roy E. Multidirectional grapple. 4,017,114, Cl. 294-88.000.

Lachema, narodni podnik: *See—*
Svoboda, Vlastimil; and Celchovska, Olga, 4,017,261.

Laessig, John D., to Columbia Research Laboratories, Inc. Headset for receiving and transmitting signals. 4,017,797, Cl. 325-16.000.

Laforest, Jacqueline: *See—*
Thuillier, Germaine; and Laforest, Jacqueline. 4,017,618.

Laforest born Boutillier du Retail, Jacqueline Suzanne: *See—*
Thuillier born Nachmias, Germaine; Laforest born Boutillier du Retail, Jacqueline Suzanne; Cariou, Bernard Jean Marie; Bessin, Pierre Alfred Rene; Bonnet born Roux, Jacqueline Suzanne; and Thuillier, Jean Eugene, 4,017,632.

Laine, Gabriel, to Automobiles Peugeot. Device for stressing with a limited force, in particular for a belt tensioner. 4,017,059, Cl. 254-54.000.

Lakomsky, Viktor Iosifovich: *See—*
Paton, Boris Evgenievich; Lakomsky, Viktor Iosifovich; Torkhov, Gennady Fedorovich; Trigub, Vladimir Kirillovich; Sheiko, Ivan Vasilievich; Verkhovtsev, Emil Vasilievich; Bakumenko, Sergei Panteleevich; Ponomarev, Nikolai Alexeevich; and Kuzmin, Anatoly Alexandrovich, 4,017,672.

Lakso Company, Incorporated, The: *See—*
Heino, Richard N., 4,017,003.

Lam, Hsiao-Ling; and Pallos, Ferenc M., to Stauffer Chemical Company. Insect growth regulators. 4,017,634, Cl. 424-300.000.

Lamers, Robert P., to Westinghouse Electric Corporation. Overspeed protection system. 4,017,217, Cl. 417-214.000.

Lampson, George P.: *See—*
Bertland, Alexander U.; Tytell, Alfred A.; Lampson, George P.; and Buynak, Eugene, 4,017,360.

Lanam, Richard: *See—*
Winter, Joseph; Lanam, Richard; and Graham, Douglas L., 4,017,337.

Lancee, Charles T.; and van Zwieten, Gerardus. Echoscope for examination of objects. 4,016,862, Cl. 128-2.00V.

Landowski, Edmund A. Pre-cast fireplace and flue assembly. 4,016,859, Cl. 126-120.000.

Lang, Theo, to Foster Grant Co., Inc. Apparatus for extruding expandable thermoplastic material. 4,017,245, Cl. 425-327.000.

Lansing, Charles W.; and Zajicek, Joseph S., to TDX, Inc. Data entry system. 4,017,837, Cl. 340-172.500.

Lapin, Vladimir Viktorovich; Bulgakov, Boris Sergeevich; Bogoyavlensky, Konstantin Nikolaevich; Rozhdestvensky, Jury Lvovich; Granosky, Simon Pavlovich; Maizelis, Genrikh Semenovich; Lazutin, Vladimir Ivanovich; and Sauskan, Ilya Alexandrovich. Method of shaping ring blanks. 4,016,739, Cl. 72-105.000.

Lardy, Jean-Louis A.: *See—*
Roche, Bernard G.; Majos, Jacques; and Lardy, Jean-Louis A., 4,017,693.

Larsen, Donald Wayne; and Billmyer, Jerrold Bain, to W. R. Grace & Co. Flow control agent for ultra thin epoxy resin powder coatings. 4,017,447, Cl. 260-31.20R.

Larsen, Paul F. Fishing lure. 4,016,671, Cl. 43-42.170.

Larsen, Richard L.; and Robnett, James J., to Raygo Wagner, Inc. Lift truck with rotatable load-handling apparatus. 4,016,992, Cl. 214-147.00G.

Larsen, Ronald Leslie, to Conwed Corporation. Seedling transplant containers. 4,016,678, Cl. 47-77.000.
Larson, Curtis L.; and Ward, John R., to Minnesota Mining and Manufacturing Company. System and device for inflating and sealing air inflated cushioning material. 4,017,351, Cl. 156-494.000.
Larson, Philip C. Method of restoring hydraulic systems. 4,017,329, Cl. 134-21.000.
Larson, Raymond L.: *See*—
Dombrowski, Frank R.; and Larson, Raymond L., 4,016,639.
Larson, Willis August, to Globe-Union Inc. Keyboard membrane switch having threshold force structure. 4,017,697, Cl. 200-5.00A.
Larsson, Bengt Hakan; and Karlsson, Hans Erik Valdemar, to Forenade Fabriksverken. Shell especially for mortars. 4,016,816, Cl. 102-67.000.
Larsson, Hans Gunnar: *See*—
Gustafsson, Sven-Goran; Larsson, Hans Gunnar; Lilja, Kjell; Lundback, Bertil; Nilsson, Jan; and Syvakari, Pertti, 4,016,737.
Larsson, Tore Ingvar: *See*—
Soukup, Franz; Larsson, Tore Ingvar; and Borg, Veine Bernt, 4,017,247.
Laser Technology, Inc.: *See*—
McLaughlin, Howard B., 4,016,856.
Lasher, David C.; and Blanchard, Kenneth F., to Xerox Corporation. Set separator. 4,017,066, Cl. 271-80.000.
Lasher, Jordan S.: *See*—
Bonnell, William S.; Christman, Robert D.; Lasher, Jordan S.; Paraskos, John A.; and Yanik, Stephen J., 4,017,382.
Lasman, Henry R.; Lebenson, Robert J.; and Wisotzky, Reuben, to Pandel-Bradford, Inc. Imitation leather material and method of preparing such material. 4,017,656, Cl. 428-86.000.
Latimer, William R., Jr., to I-T-E Imperial Corporation. Ferrule fuse terminal clip with pivoted rejector. 4,017,816, Cl. 337-227.000.
Lauck, Lawrence J., to United Technologies Corporation. Gas turbine engine having an improved transition duct support. 4,016,718, Cl. 60-39.320.
Lauger, Alfred; and Schrade, Jochen, to Dornier System GmbH. Drive for high-speed axles or shafts of spindles. 4,016,713, Cl. 57-100.000.
Lauk, David V.; and Bills, Lloyd W. Device for cleaning ink from a printing apparatus. 4,016,812, Cl. 101-425.000.
Launderville, Paul Calvin: *See*—
Simmons, David Harry; and Launderville, Paul Calvin, 4,017,784.
Laurent-Atthalin, Albert: *See*—
Batoux, Bernard; Laurent-Atthalin, Albert; and Salmon, Michel, 4,017,306.
Lavins, Paul N., Jr.; and Vanek, Willard J., to American Induction Heating Corporation. Multiple station induction heating machine. 4,017,703, Cl. 219-10.690.
Law, Kenneth William: *See*—
Astley, Edward Pryce; Jones, Owen Morris; and Law, Kenneth William, 4,016,915.
Lawrence, James F., Jr. Magnetically coupled indicator means for control setting. 4,016,827, Cl. 116-129.00D.
Lawrence, John P., to Goodyear Tire & Rubber Company, The. Process of preparing unsymmetrical disulfides. 4,017,489, Cl. 260-243.00B.
Lawrence Peska Associates, Inc.: *See*—
Tepedino, Patrick, 4,016,654.
Lawton, Richard W., to General Electric Company. Implantable electrochemical sensor. 4,016,866, Cl. 128-2.00E.
Lazutin, Vladimir Ivanovich: *See*—
Lapin, Vladimir Viktorovich; Bulgakov, Boris Sergeevich; Bogoyavlensky, Konstantin Nikolaevich; Rozhdestvensky, Jury Lvovich; Granosky, Simon Pavlovich; Maizelis, Genrikh Semenovich; Lazutin, Vladimir Ivanovich; and Sauskan, Ilya Alexandrovich, 4,016,739.
Lear Siegler, Inc.: *See*—
Gerrity, Robert John; Wandrey, Clarence Dwight; and Dolbin, Benjamin Howard, deceased, 4,017,718.
Lebenson, Robert J.: *See*—
Lasman, Henry R.; Lebenson, Robert J.; and Wisotzky, Reuben, 4,017,656.
Le Corvec, Robert: *See*—
Lenglin, Thierry; Lissillour, Albert; Desaunay, Jean-Louis; Le Corvec, Robert; Simonneau, Robert; and Rouquaud, Richard, 4,017,134.
Ledoux, Andre: *See*—
Menard, Pierre R.; and Ledoux, Andre, 4,016,959.
Lee, Kenneth E.: *See*—
Johnson, Richard C.; and Lee, Kenneth E., 4,016,820.
Lee, Tsao-Piao. Pipette controller with graduate reading plunger. 4,016,765, Cl. 73-425.600.
Legendre, Serge, to Essilor International (Compagnie Generale d'Optique). Copying machine notably for grinding concave surfaces. 4,016,682, Cl. 51-50.0PC.
Lehman, Donald F.: *See*—
Hatton, Derald R.; and Lehman, Donald F., 4,017,387.
Lehman, James A. Spring type bottle cap pistol. 4,016,854, Cl. 124-27.000.
Leitermann, Wulf; and Zimmermann, Hans-Georg, to Audi NSU Auto Union Aktiengesellschaft; and Wankel GmbH. Method of manufacturing piston sealing strips of rotary piston machines. 4,016,635, Cl. 29-156.600.
Leliaert, Raymond M., to Wheelabrator-Frye, Inc. Surface treatment device for large diameter pipe sections. 4,016,681, Cl. 51-9.00M.
Lemberg, Werner: *See*—
Anwer, Jamil; Banchik, Ira Norman; Bode, Gerhard Wilhelm; Lemberg, Werner; and Sud, Kuldip Kumar, 4,017,272.
LeMere, Roger: *See*—
Crawford, Douglas J.; LeMere, Roger; and Hughes, Francis H., 4,017,064.
Lemin, Alan J.; and O'Connell, Paul W., to Upjohn Company, The. Certain diphenylalkanoamides used as bird and murine repellents. 4,017,630, Cl. 424-267.000.
Lenglin, Thierry; Lissillour, Albert; Desaunay, Jean-Louis; Le Corvec, Robert; Simonneau, Robert; and Rouquaud, Richard, to L'Etat Francais, represente par le Ministre des Postes et Telecommunications; and Socotel Societe Mixte pour le Developpement de la Technique de la Commutation dans le Domaine des Telecommunications. Rack-mounting for electronic equipments. 4,017,134, Cl. 312-351.000.
Lenk, Erich, to Barmag Barmer Maschinenfabrik Aktiengesellschaft. Melt spinning apparatus. 4,017,249, Cl. 425-382.200.
Lenz, Werner; Woellhaf, Josef; Spreng, Klaus; Zuerger, Manfred; Hecke, Paul; Hoffmann, Gerhard; and Obradovic, Milan, to BASF Aktiengesellschaft. Apparatus for the production of exposed printing plates. 4,017,183, Cl. 355-85.000.
Lenzen, Glenn H., Jr.: *See*—
Engel, Simon L.; Gale, Preston L.; and Lenzen, Glenn H., Jr., 4,017,708.
Le Pierres, Gildas, to International Vibration Engineering. Shock absorber for firearms and the like. 4,016,799, Cl. 89-42.00B.
Lerjen, Georg, to BBC Brown Boveri & Company Limited. Shaft seal for turbomachines. 4,017,088, Cl. 277-53.000.
Lermann, Peter; Fauth, Gunter; and Muller, Herbert, to AGFA-Gevaert, A.G. Self-developing type photographic apparatus with spread roller system. 4,017,879, Cl. 354-304.000.
Les Cables de Lyon: *See*—
Aupoix, Marcel; and Trezeguet, Jean-Pierre, 4,017,814.
Leslie, Donald J. Planetary acoustic phase shift mechanism. 4,017,685, Cl. 179-1.500.
Lesney Products Corporation: *See*—
Resnick, Charles; and Zant, Fred, 4,016,674.
Lester, Joseph H., to Western Food Equipment Company. Process for standardizing milk by monitoring the fat content of the blended milk product. 4,017,643, Cl. 426-231.000.
L'Etat Francais, represente par le Ministre des Postes et Telecommunications: *See*—
Lenglin, Thierry; Lissillour, Albert; Desaunay, Jean-Louis; Le Corvec, Robert; Simonneau, Robert; and Rouquaud, Richard, 4,017,134.
Letelier, Carlos Sunkel; and CilleroGrafulla, Fernando, to Alter, S.A. Process for purifying the mixed ester, ethylene glycol 1-(2-p-chlorophenoxy)-2-methylpropionate nicotinate. 4,017,502, Cl. 260-295.50R.
Leusner, Bernd W.; and Schulz, Hans-Hermann, to Bayer Aktiengesellschaft. Impression tray for dental purposes. 4,016,650, Cl. 32-17.000.
Lever Brothers Company: *See*—
Stubbs, Christopher Edward; Nooi, Jacobus Roelof; and Kemper, Hermanus Christoffel, 4,017,541.
Levesque, Alston L., to Raymond Lee Organization, Inc. Penis locking and lacerating vaginal insert. 4,016,875, Cl. 128-132.00R.
Levin, Howard J.: *See*—
Gomez, Eloy A.; and Levin, Howard J., 4,017,616.
Lewis, Arthur E., to United States of America, Energy Research and Development Administration. Method for rubblizing an oil shale deposit for in situ retorting. 4,017,119, Cl. 299-2.000.
Lewis, Irwin Charles; McHenry, Edgar Ronald; and Singer, Leonard Sidney, to Union Carbide Corporation. Process for producing mesophase pitch. 4,017,327, Cl. 106-273.00R.
Leydorf, George F.: *See*—
Tharp, Nelson B.; Henry, John W.; and Leydorf, George F., 4,017,863.
Leyshon, David W.: *See*—
Angevine, Peter A.; and Leyshon, David W., 4,017,585.
Lichtman, Samuel W., to United States of America, Navy. Transmitter for use in a laser communication and ranging system. 4,017,146, Cl. 350-7.000.
Lilja, Kjell: *See*—
Gustafsson, Sven-Goran; Larsson, Hans Gunnar; Lilja, Kjell; Lundback, Bertil; Nilsson, Jan; and Syvakari, Pertti, 4,016,737.
Lim, Gary; and Hooper, John W., to Bristol-Myers Company. Process for the preparation of 14-hydroxymorphinan derivatives. 4,017,497, Cl. 260-285.000.
Lindsay, George F.; and Whitehouse, Harper John, to United States of America, Navy. Inverse Wiedemann effect torsional delay line matched filter device. 4,017,811, Cl. 333-30.00M.
Lindsay, Michael L., to Doric Foods Corporation. Adjustable flash removal assembly for molded containers. 4,017,243, Cl. 425-292.000.
Lindstrom, Nils Folke Rune, to Boliden Aktiebolag. Method for the electrolytic recovery of Sb, As, Hg and/or Sn. 4,017,369, Cl. 204-121.000.
Linke, Adolf: *See*—
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Lissillour, Albert: *See*—
Lenglin, Thierry; Lissillour, Albert; Desaunay, Jean-Louis; Le Corvec, Robert; Simonneau, Robert; and Rouquaud, Richard, 4,017,134.
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Litton Systems, Inc.: *See*—
Knowles, Robert Gordon, 4,017,143.

Simmons, David Harry; and Launderville, Paul Calvin, 4,017,784.

Litz, Donald C., to Westinghouse Electric Corporation. Fluid-cooled rotating member with improved coolant exhaust structure suitable for superconducting dynamoelectric machinery. 4,017,755, Cl. 310-40.00R.

Loberg, Michael Dewey; Callery, Patrick Stephen; and Cooper, Malcolm, to Research Corporation. Radiopharmaceutical chelates and method of external imaging. 4,017,596, Cl. 424-1.000.

Locher, Hans: *See—*
Felix, Ernst; and Locher, Hans, 4,016,790.

Lock, Chuck. Electronic acupuncture point finder. 4,016,870, Cl. 128-2.10C.

Lock, William E. Dump bar transfer mechanism. 4,016,797, Cl. 89-34.000.

Lockheed Missiles & Space Company, Inc.: *See—*
Webster, Donald; and Crooks, Donald D., 4,017,333.

Lockshaw, John E. Rotary-valve device for internal-combustion engines. 4,016,840, Cl. 123-75.00B.

Lodi, Frank, to Fast Heat Element Manufacturing Co., Inc. Heater for severing plastic film. 4,017,713, Cl. 219-243.000.

Loffelman, Frank Fred: *See—*
Buell, Bennett George; and Loffelman, Frank Fred, 4,017,486.

Loftus, John M.: *See—*
Daly, Lewis J.; and Brownlie, Alan W., 4,017,069.

Lohr, Delmar Frederick, Jr., to Firestone Tire & Rubber Company, The. Stabilization of poly(phosphazenes). 4,017,458, Cl. 260-45.75W.

Loiterman, Leo. Apparatus for measuring the transmittance or opacity of a gaseous medium carrying particulate matter through a conduit. 4,017,193, Cl. 356-206.000.

London, Joe F., Jr., to Burlington Industries, Inc. High stretch yarn texturing, dycing and package production. 4,016,715, Cl. 57-157.0TS.

Long, Joe E. Apparatus for lining a continuous concrete pipe. 4,017,226, Cl. 425-59.000.

Looker, Robert, to Satron, Inc. Woven rope. 4,016,911, Cl. 139-383.00R.

Lopker, Edwin B., to Pullman Incorporated. Method and apparatus for filtration of slurries. 4,017,399, Cl. 210-408.000.

Lorber, Harold; and Duboff, Irving. Magnetically enhanced coaxial cable with improved time delay characteristics. 4,017,344, Cl. 156-52.000.

Lords, James: *See—*
Rozzell, Thomas C.; Johnson, Curtis; Durney, Carl; and Lords, James, 4,016,761.

Lorenz, Hans Peter: *See—*
Sauer, Gerhard; Lorenz, Hans Peter; Eder, Ulrich; Haffer, Gregor; Ruppert, Jurgen; and Wiechert, Rudolf, 4,017,545.

Lorenz, Walter; Hammann, Ingeborg; and Stendel, Wilhelm, to Bayer Aktiengesellschaft. O-alkyl-O-[7-nitrobenzisoxazol(3)yl]-thionophosphoric (phosphonic) acid esters. 4,017,609, Cl. 424-200.000.

Lorkowski, Jonathan L., to Raymond Lee Organization, Inc., The, a part interest. Garden hose coupler. 4,017,103, Cl. 285-155.000.

Los, Marinus, to American Cyanamid Company. Imidazoisoindolediones and the use thereof as herbicidal agents. 4,017,510, Cl. 260-309.600.

Ludwig, Charles H.; and Fiske, Larry B., to Georgia-Pacific Corporation. Cationic bituminous emulsions. 4,017,419, Cl. 252-311.500.

Ludwig, Charles H., to Georgia-Pacific Corporation. Lignin composition and a process for its preparation. 4,017,475, Cl. 260-124.00A.

Lukashov, Anatoly Ivanovich: *See—*
Gorbunov, Boris Nikolaevich; Efremova, Galina Dmitrievna; Kukartsev, Evgeny Maximovich; Erokhina, Lidia Vladimirovna; Lukashov, Anatoly Ivanovich; Orlyansky, Vitaly Vasilievich; Khardin, Alexandr Pavlovich; Churikova, Ideya Antonovna; and Valdman, Daniil Iosifovich, 4,017,518.

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Lundback, Bertil: *See—*
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Lundquist, Sven Anders: *See—*
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Lux, Helmut: *See—*
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Lynch, Thomas, to Xerox Corporation. Document feeding apparatus. 4,017,172, Cl. 355-8.000.

M. H. Sanders et al.: *See—*
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Maas, Hermann; and von Bormann, Georg, to August Thyssen-Hutte AG. Process for hot topping by electro-slag-remelting. 4,016,923, Cl. 164-52.000.

Maatschappij Van Berkel's Patent N.V.: *See—*
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Macander, Rudy F.: *See—*
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MacChesney, John Burnette: *See—*
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Machlett Laboratories, Incorporated, The: *See—*
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Macholdt, Hans: *See—*
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MacKay, Donald B.; Nielson, Brian C.; Henriksen, Dale L.; Billings, Roger Evan; Simons, Harold M.; and Hindmarsh, Paul P., to Billings Energy Research Corporation. Hydride fuel system. 4,016,836, Cl. 123-3.000.

Madison, Theodore N., to Royal Business Machines, Inc. Typewriter jam release mechanism. 4,016,966, Cl. 197-16.000.

Maeda, Kazuyuki: *See—*
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Maffei, Ernest J.; and Patch, David W. Three-part intramedullary bone-setting pin. 4,016,874, Cl. 128-92.0BC.

Magnesital-Feuerfest GmbH: *See—*
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Magone, Raymond L.; and Saaty, Samir N., to Upjohn Company, The. Method of molding articles of polymeric foam substantially free from flashing. 4,017,572, Cl. 264-51.000.

Maher, Francis William, Jr.; and Pirc, Vladimir Valentine, to Perkin-Elmer Corporation, The. Apparatus for blood film preparation. 4,016,828, Cl. 118-6.000.

Maier, Ralph D., to Aluminum Company of America. Method of continuous casting with weighted float-distributor. 4,016,924, Cl. 164-82.000.

Main, Glen A. Canoe portaging kit. 4,016,615, Cl. 9-1.400.

Maisch, Wolfgang, to Robert Bosch G.m.b.H. Short circuit protected electronic control system. 4,017,765, Cl. 361-88.000.

Maizelis, Genrikh Semenovich: *See—*
Lapin, Vladimir Viktorovich; Bulgakov, Boris Sergeevich; Bogoyavlensky, Konstantin Nikolaevich; Rozhdestvensky, Jury Lvovich; Granosky, Simon Pavlovich; Maizelis, Genrikh Semenovich; Lazutin, Vladimir Ivanovich; and Sauskan, Ilya Alexandrovich, 4,016,739.

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Makushok, Evgeny Markellovich: *See—*
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Maloney-Crawford Tank Corporation: *See—*
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Maloney, James E., to Economics Laboratory, Inc. Liquid phosphatizing composition and use thereof. 4,017,335, Cl. 148-6.15R.

Maly, Neil A.: *See—*
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Manig, Gerd: *See—*
Doge, Klaus; Manig, Gerd; Hentsch, Wolfgang; and Mucke, Johannes, 4,017,206.

Mann, George H., to Corning Glass Works. Process for making multifocal photochromic ophthalmic lens. 4,017,292, Cl. 65-33.000.

Manor, Giora. Temperature differential sensing and control device. 4,017,028, Cl. 237-1.00A.

Manoury, Philippe Michel Jacques: *See—*
Giudicelli, Don Pierre Rene Lucien; Najer, Henry; Manoury, Philippe Michel Jacques; and Dumas, Andre Pierre Fernand, 4,017,623.

Manz, Vernon F.; and Metcalfe, Robert A., to United Technologies Corporation. Conveyor tube for a particulate heating furnace. 4,017,061, Cl. 266-173.000.

Marantette, Ruth B.: *See—*
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Marantette, William F.; and Marantette, Ruth B. High speed drill system. 4,017,203, Cl. 408-240.000.

Marchenko, Alexandr Nikolaevich; and Tjutjunnikov, Anatoly Borisovich. Rotary film evaporating apparatus. 4,017,354, Cl. 159-6.00R.

Marchetti, Joseph R.: *See—*
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Marie, Daniel: *See—*
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Marks, Mortimer: *See—*
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Marsan, Mario Stephen: *See—*
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Marsee, Frederick J., to Ethyl Corporation. Fuel induction system. 4,016,845, Cl. 123-122.0AC.

Marshall, James F.: *See—*
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Marshall and Williams Company: *See*—
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Marsili, Leonardo; Rossetti, Vittorio; and Pasqualucci, Carmine, to Archifar Industrie Chimiche del Trentino S.p.A. Rifamycin compounds. 4,017,481, Cl. 260-239.30P.
Martin, Alfred J.: *See*—
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Martin, Eugene G.; and Martin, Harold C., to Victor F. Weaver, Inc. Poultry cut-up machine. 4,016,624, Cl. 17-11.000.
Martin, Frank E.; Colston, John R.; and Smith, Norman E., to Westinghouse Electric Corporation. Breathing apparatus. 4,016,876, Cl. 128-142.00R.
Martin, Harold C.: *See*—
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Maruyama, Isamu; Nakao, Masaru; Sasajima, Kikuo; Inaba, Shigeho; and Yamamoto, Hisao, to Sumitomo Chemical Company, Limited. N-(ω-Amino)alkylaniline derivatives. 4,017,624, Cl. 424-250.000.
Maruyama, Isamu: *See*—
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Maruyama, Tokuji: *See*—
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Mashburn, Douglas N.; Stevens, Richard H.; and Woodall, Harold C., to United States of America, Energy Research and Development Administration. Traversing probe system. 4,016,768, Cl. 74-23.000.
Mason, Burton Hoster. Device for severing underwater cables. 4,016,728, Cl. 61-69.00R.
Mason, Henry Stanford, to H. S. Mason Pty. Limited. Pivotal connection. 4,017,198, Cl. 403-43.000.
Masui, Hiroaki: *See*—
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McAfee, John Gilmour: *See*—
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McCullough, John F.; and Sheridan, Richard C., to Tennessee Valley Authority. Production of ammonium polyphosphates from melamine phosphates. 4,017,589, Cl. 423-315.000.
McDonald, James Anthony; and Schatz, Ralph Arthur, to Motorola, Inc. Battery isolator. 4,017,779, Cl. 320-15.000.
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McKay, Glenn E.: *See*—
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McKee, James W., to True Data Corporation. Card transport apparatus. 4,017,068, Cl. 271-275.000.
McLaughlin, Howard B., to Laser Technology, Inc. Wire cutting machine. 4,016,856, Cl. 125-21.000.
McMahon, William Henry, to American Laser Corporation. Switching regulator power supply. 4,017,745, Cl. 307-254.000.
McMullen, William H.; and Andino, Rosemary, to Novo Industri A/S. Production of high purity glucose syrups. 4,017,363, Cl. 195-31.00R.
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Meier, Ernst, to Stopinc Aktiengesellschaft. Closure element for a slide closure and process for the manufacture thereof. 4,017,010, Cl. 222-590.000.
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Meiji Seika Kaisha, Ltd.: *See*—
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Melancon, Lionel P., to United States of America, Navy. Multi-frequency oscillator circuit. 4,017,809, Cl. 331-179.000.
Mellor, Eli K., to Dynasciences Corporation. Multi-mode cannulating apparatus. 4,016,879, Cl. 128-214.400.
Menapace, Henry R.; and Maly, Neil A., to Goodyear Tire & Rubber Company, The. Bicyclo-[3'3'0]-octa-2-ene formed by isomerizing 1,5-cyclooctadiene. 4,017,552, Cl. 260-666.0PY.
Menard, Pierre R.; and Ledoux, Andre, to Societe S A B. Actuator for a rail wheel tread scrubber block. 4,016,959, Cl. 188-196.00B.
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Mercer, James R., to McDowell-Wellman Engineering Company, The. Injection molding apparatus. 4,017,242, Cl. 425-243.000.
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Merkl, George G. Metallic-organo-peroxide and organo-metallic-peroxide. 4,017,527, Cl. 260-448.0AD.
Merkl, George G. Process utilizing activated aluminum and products produced thereby. 4,017,591, Cl. 423-387.000.
Merkle, Eberhard, to Wilh. Bleyle KG. Filament monitoring device. 4,016,732, Cl. 66-163.000.
Merrigan, Denis F. Focal scanning aid. 4,016,659, Cl. 35-35.00B.
Mess, Richard C.; and Tausanovitch, Dusan, to Dayton Sure-Grip & Shore Co., The. Tie rod hole plug in combination with a wall hole. 4,016,696, Cl. 52-514.000.
Messier, Jean: *See*—
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Messina, Giuseppe; Olah, George Andrew; and Moraglia, Riccardo, to Societa' Italiana Resine S.I.R.. S.p.A. Process for the recovery of aluminum trichloride. 4,017,584, Cl. 423-122.000.
Messrs. Berendsohn AG: *See*—
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Metal Box Company Limited, The: *See—*
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Meyer, Rudolf; and Hoffmann, Klaus, to AGFA-Gevaert, A.G. Ink recorder for the jet-ink-process. 4,017,869, Cl. 346-75.000.
Meyer, Willy: *See—*
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Michels, Martin; and Settele, Wilhelm, to Sigri Elektrographit GmbH. Method and apparatus for graphitization of carbon materials. 4,017,673, Cl. 13-7.000.
Midland-Ross Corporation: *See—*
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Milam, Joseph E.; and Carlson, Gordon A., to PPG Industries, Inc. Liquid phase chlorination of aromatic hydrocarbons using manganese chloride catalyst. 4,017,551, Cl. 260-650.00R.
Miller, Conrad O. M.: *See—*
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Miller, Donald A.: *See—*
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Miller, Donald E., to Burroughs Corporation. Display panel for displaying a bar of light. 4,017,759, Cl. 313-217.000.
Miller, Gerald K., to Nartron Corporation. Timing circuit means. 4,017,746, Cl. 307-293.000.
Miller, Lewis F., to International Business Machines Corporation. Ternary barrier structure for conductive electrodes. 4,017,889, Cl. 357-67.000.
Miller, Maurice E. Harrow disc gang. 4,016,935, Cl. 172-601.000.
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Milligan, James W., to Duncan Electric Company, Inc. Heat sensitive fault detecting and indicating system for watthour meter. 4,017,795, Cl. 324-110.000.
Milligan, Robert J.; Fitzgerald, Walter P., Jr., deceased; and by Fitzgerald, Mary E., surviving spouse, to Whittaker Corporation. Polybenzimida zoquinazolines and prepolymers for making same. 4,017,466, Cl. 260-78.0TF.
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Mills, James Philip George, to Varian Techtron Pty. Ltd. Adjustable slit mechanism. 4,017,162, Cl. 350-271.000.
Mimata, Tsutomu, to Hitachi, Ltd. Grinding method. 4,016,855, Cl. 125-13.00R.
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Minami, Shinsaku; Matsumoto, Jun-Ichi; Sugita, Minoru; Shimizu, Masanao; Takase, Yoshiyuki; and Nakamura, Shinichi, to Dainippon Pharmaceutical Co., Ltd. Piperazine derivatives. 4,017,622, Cl. 424-250.000.
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Mingasson, Georges Raymond Henry; Montu, Michel Louis Jules; and Alicot, Michel Jean Camille, to Ugine Kuhlmann. Process for the preparation of 2-benzo thiazole sulphinamides. 4,017,506, Cl. 260-306.60R.
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Mitchell, Edwin B. Apparatus for sizing and deheading shrimp. 4,016,625, Cl. 17-71.000.
Mitchell, George A. Intermittent movement with tandem cams. 4,017,167, Cl. 352-194.000.
Mitsubishi Chemical Industries Ltd.: *See—*
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Miura, Yuichi; Yutani, Kiyohiko; Takesue, Hitoshi; and Fujii, Kenji, to Tokuyama Soda Kabushiki Kaisha. Microbiological process for preparing L-tartaric acid in presence of surfactants. 4,017,362, Cl. 195-30.000.
Miyamoto, Koichi: *See—*
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Moffett, Robert B., to Upjohn Company, The. As-triazinobenzodiazepin-1-ones. 4,017,492, Cl. 260-248.0AS.
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Moores, Robert Gordon, Jr.; and Walton, Richard Eugene, II, to Black and Decker Manufacturing Company, The. Sharpener for twist drills including grinding wheel dressing means. 4,016,680, Cl. 51-5.00D.
Moores, Robert Gordon, Jr.; and Walton, Richard Eugene, II, to Black and Decker Manufacturing Company, The. Sharpener for twist drills equipped with a chuck and drill bit locator. 4,016,685, Cl. 51-219.00R.
Moraglia, Riccardo: *See—*
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Morgan, Charles R., to W. R. Grace & Co. Solid radiation curable polyene compositions containing liquid polythiols and solid styrene-allyl copolymer based polyenes. 4,017,371, Cl. 204-159.180.
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Morimoto, Tadashi: *See—*
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Morris, Harold D., to Systron Donner Corporation. Counting accelerometer apparatus. 4,016,766, Cl. 73-517.00R.
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Morton, Clyde M. Method for fueling combustion engines. 4,016,839, Cl. 123-69.00R.
Morton, Peter Harlow; Cohen, Enrico; and Good, Jeremy Andrew. Magnetic separator systems. 4,017,385, Cl. 209-214.000.
Morton, William G. Safety helmet with individualized head-contoured inter-liner. 4,016,734, Cl. 69-8.000.
Mose, Luciano; Kramer, Wolfgang; Strewe, Wolfgang; and Strasser, Bernd, to Hooker Chemicals & Plastics Corporation. Electrolytic cell. 4,017,376, Cl. 204-258.000.
Motojima, Kenji; Iwasaki, Matae; Suzuki, Kazuya; Komaki, Yoshihide; and Ichiyanagi, Katsuaki, to Japan Atomic Energy Research Institute. Volitilization process for separation of molybdenum-99 from irradiated uranium. 4,017,583, Cl. 423-2.000.
Motorola, Inc.: *See—*
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Mullins, Darrell Dexter, to Monsanto Company. N-(nitroalkyl)-N'-phenyl-p-phenylenediamines. 4,017,544, Cl. 260-576.000.
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Murray, David George; and Somerset, James Henry, to Research Corporation. Knee joint prosthesis. 4,016,606, Cl. 3-1.911.
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Mutschler, Ulrich F., to I E R Impression Enregistrement des Resultats. Selectively separable strip assembly. 4,017,655, Cl. 428-43.000.
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Nixdorf, Hans Willi. Windshield cleaning device for motor vehicles. 4,016,623, Cl. 15-250.030.
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Ohno, Shigeru; Hoshi, Noboru; and Sekigawa, Fujio, to Shin-Etsu Chemical Company Limited. Preparation of readily disintegrable tablets. 4,017,598, Cl. 424-35.000.
Ohno, Shigeru; Hoshi, Noboru; and Sekigawa, Fujio, to Shin-Etsu Chemical Company Limited. Method for providing enteric coatings on solid dosage forms. 4,017,647, Cl. 427-3.000.
Ohta, Yoshimoto, to Tokico Ltd. Vehicle anti-skid braking device. 4,017,126, Cl. 303-115.000.
Ohtsuka, Yozo, to Sagami Chemical Research Center. Diaminomaleonitrile derivatives and processes for preparing the same. 4,017,533, Cl. 260-465.00E.
Oikarinen, Eino Heikki. Device for the de-airing of a liquid system, preferably a system for hydraulic brakes. 4,016,896, Cl. 137-205.000.
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Ono, Yuichi; Kurata, Kazuhiro; Kawamura, Masao; Morioka, Makoto; and Ito, Kazuhiro, to Hitachi, Ltd. Light emitting semiconductor device and a method for making the same. 4,017,881, Cl. 357-18.000.
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Oprandi, Pierre; and Romeas, Rene, to Thomson-Brandt. Method of detecting defects in read out signals, and apparatus for implementing the same. 4,017,895, Cl. 358-127.000.
Ordonez, Emil, to Raymond Lee Organization, Inc., The, a part interest. Combination bed and desk. 4,016,610, Cl. 5-2.00R.
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Gorbunov, Boris Nikolaevich; Efremova, Galina Dmitrievna; Kukartsev, Evgeny Maximovich; Erokhina, Lidia Vladimirovna; Lukashov, Anatoly Ivanovich; Orlyansky, Vitaly Vasilievich; Khardin, Alexandr Pavlovich; Churikova, Ideya Antonovna; and Valdman, Daniil Iosifovich, 4,017,518.
Orth, George O.: *See—*
Orth, George O., Jr.; and Orth, Richard D., 4,017,642.
Orth, George O., Jr.; and Orth, Richard D., to Orth, George O. Process of making food for ruminant animals from wood and/or woody products. 4,017,642, Cl. 426-69.000.
Orth, Richard D.: *See—*
Orth, George O., Jr.; and Orth, Richard D., 4,017,642.
Osaka Soda Co., Ltd.: *See—*
Suzui, Akio; Nose, Shinji; Kodama, Takashi; Yokoyama, Kenji; Matsumoto, Kazuya; and Fujio, Yoshiharu, 4,017,434.
Osaka, Tomikazu; and Otsuka, Morihisa, to Fukuvi Chemical Industry Co., Ltd. Drain trough member and its connector. 4,016,727, Cl. 61-11.000.
Osujo, Masahide; Ikegami, Seiiti; Murayama, Yoshinobu; Omura, Takaho; and Morimoto, Tadashi, to Kubota Tekko Co., Ltd. Ball-ramp cam actuated disk brake. 4,016,957, Cl. 188-72.700.
Oswald, Alexis A.; and Valint, Paul L., to Ciba-Geigy AG. O-ethyl-S-n-butyl-O-(2- or 3-nitrophenyl) phosphorothiolates. 4,017,563, Cl. 260-954.000.
Othmer, Donald F. Wet combustion process. 4,017,421, Cl. 252-416.000.
Otsuka, Morihisa: *See—*
Osaka, Tomikazu; and Otsuka, Morihisa, 4,016,727.
Otto, Oberdan W., to Hughes Aircraft Company. Surface acoustic wave notch filter. 4,017,813, Cl. 333-72.000.
Ours, Carroll Wayne: *See—*
Jones, Peter Hadley; Kyncl, Jaroslav; Ours, Carroll Wayne; and Somani, Pitambar, 4,017,636.
Owens-Corning Fiberglas Corporation: *See—*
Foley, Kevin M.; McCombs, Frank P.; and Vigo, Francesco M., 4,017,657.
Owens-Illinois, Inc.: *See—*
Braker, Frederick William; Heckman, Russell William; Nickey, George Allen; and Potter, Terry Clair, 4,016,706.
Chang, Long Fei; and Kontz, Robert F., 4,017,250.
Fein, Michael E.; and Salisbury, Charles W., 4,017,808.
Kalata, Daniel R.; and Huston, Henry H., 4,016,976.
Moan, Kenneth L., 4,016,860.
Rapp, James R., 4,017,317.
Oxy Metal Industries Corporation: *See—*
Matsushima, Yasunobu; Oka, Hideo; Noji, Katsuyoshi; and Nakagawa, Hiroyoshi, 4,017,334.

Oya, Yuichiro: *See*—
Tomono, Masami; Abe, Akira; Harada, Seiki; Sato, Kikuji; Takagi, Takeshi; Kamoshita, Genichi; Oya, Yuichiro; and Saiki, Atsushi, 4,017,886.

P.I.V. Antrieb Werner Reimers Kommanditgesellschaft: *See*—
Berens, Heinrich; and Fule, Stefan, 4,016,771.

Paalman, H. Hunter: *See*—
Carlson, Elwood L.; Gunkler, Albert A.; Miller, Conrad O. M.; and Paalman, H. Hunter, 4,017,120.

Paepke, Horst. Tensioning device for traveling yarns and the like. 4,017,038, Cl. 242-152.100.

Pagano, Joseph F.: *See*—
Bowie, Betty Anne; and Pagano, Joseph F., 4,017,420.

Paitson, John L.: *See*—
Dick, Charles W.; Johnston, Otis A.; Paitson, John L.; and Savit, Carl H., 4,016,951.

Pako Corporation: *See*—
Pone, John, Jr.; Schrupp, Kenneth B.; Gilligan, Patrick J.; Harvey, Ronald B.; and Jensen, Gerald A., 4,017,179.

Pallos, Ferenc M.: *See*—
Lam, Hsiao-Ling; and Pallos, Ferenc M., 4,017,634.

Palmer, William B.: *See*—
Wielang, Joseph A.; Palmer, William B.; and Kerr, William B., 4,017,253.

Palmer, William Earl, to Ingersoll-Rand Company. Condenser contamination removal arrangement. 4,016,927, Cl. 165-70.000.

Palmquist, Steven Robert: *See*—
Jaconetty, George Richard; and Palmquist, Steven Robert, 4,017,695.

Palosi, Eva: *See*—
Hideg, Kalman; Hankovszky, Olga; Palosi, Eva; Hajos, Gyorgy; and Szporny, Laszlo, 4,017,507.

Pan Lei, Peter, to Krommes, Gerd. Apparatus for increasing the ignition voltage of internal combustion engines. 4,016,849, Cl. 123-148.0DC.

Pandel-Bradford, Inc.: *See*—
Lasman, Henry R.; Lebenson, Robert J.; and Wisotzky, Reuben, 4,017,656.

Panush, Sol, to Celanese Coatings & Specialties Company. Transparent pigment dispersion process. 4,017,448, Cl. 260-31.40R.

Papinchak, Michael J.; and Ravasio, Dino, to United States Steel Corporation. Notched-flight feeder screws for briquetting operation. 4,017,241, Cl. 425-237.000.

Paraskos, John A.: *See*—
Bonnell, William S.; Christman, Robert D.; Lasher, Jordan S.; Paraskos, John A.; and Yanik, Stephen J., 4,017,382.

Paredes-Galvan, Ricardo. System and detector for measuring by means of sound the liter weight of the material in satellite coolers for rotative ovens. 4,016,746, Cl. 73-32.00R.

Parker, Roger Alan, to Richardson-Merrell Inc. Hypolipidemic agents. 4,017,514, Cl. 260-332.20G.

Parkins, William E.: *See*—
Barclay, Kenneth M.; Birk, James R.; and Parkins, William E., 4,017,271.

Parks, William E., to Wiremold Company, The. Electrical raceway and receptacle assemblies. 4,017,137, Cl. 339-21.00R.

Pasqualucci, Carmine: *See*—
Marsili, Leonardo; Rossetti, Vittorio; and Pasqualucci, Carmine, 4,017,481.

Passey, Arjun Dev, now by change of name Chand Arjun Passey. Heat pump freeze drying system. 4,016,657, Cl. 34-92.000.

Patch, David W.: *See*—
Maffei, Ernest J.; and Patch, David W., 4,016,874.

Paton, Boris Evgenievich; Lakomsky, Viktor Iosifovich; Torkhov, Gennady Fedorovich; Trigub, Vladimir Kirillovich; Sheiko, Ivan Vasilievich; Verkhovtsev, Emil Vasilievich; Bakumenko, Sergei Panteleevich; Ponomarev, Nikolai Alexeevich; and Kuzmin, Anatoly Alexandrovich. Plasma-arc furnace for remelting metals and alloys. 4,017,672, Cl. 13-2.00P.

Patterson, James W.: *See*—
Soures, Nicholas M.; Patterson, James W.; and Powley, Wayne C., 4,017,067.

Patterson, John F., Jr., to Westinghouse Electric Corporation. Nuclear core inlet flow arrangement. 4,017,357, Cl. 176-61.000.

Paulson, Wesley R., to United States of America, Navy. Event stacker and display device. 4,017,836, Cl. 340-172.000.

Paxton, Lee C. Lock for sliding windows and doors. 4,017,105, Cl. 292-288.000.

Payne, William J., to Modulus Corporation. Temperature indicator. 4,016,762, Cl. 73-358.000.

Pean, Pierre Jean-Louis; Mauroux, Josette Andree; and Rey, Bernard. Union for coupling members. 4,017,196, Cl. 403-2.000.

Pearsall, Thomas J.: *See*—
Karaba, Albert M.; Brouwers, Alexander P.; and Pearsall, Thomas J., 4,016,841.

Pease, Bobbylee; and Simpson, Clark C., to Clark Equipment Company. Cylinder and piston assembly. 4,017,110, Cl. 294-81.0SF.

Pederson, Carl N.; and Angelopoulos, Peter G., to Johnson Service Company. Digital multiplexing system employing remote scanning of a plurality of monitoring points. 4,017,683, Cl. 178-69.100.

Peickert, Wilfried R.: *See*—
Sielaff, Ulrich; and Peickert, Wilfried R., 4,016,864.

Pell, James W., Jr.: *See*—
Fife, Merrill E.; and Pell, James W., Jr., 4,017,824.

Pellation, Ernest C., to Fibreboard Corporation. Carton closure. 4,017,018, Cl. 229-39.00R.

Penard, Herbert F. L.; and Risseeuw, Johannis I., to Comprimo N.V. Process for production of aqueous hypochlorous acid solution. 4,017,592, Cl. 423-473.000.

Penkman, Dave; and Rees, Herbert, to Husky Injection Molding Systems Inc. Mold-clamping mechanism for injection-molding machine. 4,017,236, Cl. 425-150.000.

Pepperman, Armand B., Jr.: *See*—
Daigle, Donald J.; Pepperman, Armand B., Jr.; and Vail, Sidney L., 4,017,462.

Perkin-Elmer Corporation, The: *See*—
Maher, Francis William, Jr.; and Pirc, Vladimir Valentine, 4,016,828.

Permanence Corporation: *See*—
Baum, Charles S., 4,017,480.

Perper, Lloyd J., to Iota Engineering Inc. Power source for fluorescent lamps and the like. 4,017,785, Cl. 321-4.000.

Peterson, Frank C.: *See*—
Heilman, William J.; Peterson, Frank C.; Renz, Mical C.; and Theard, Leslie P., 4,017,453.

Peterson, Robert S., to Westinghouse Electric Corporation. Range control for an automatic gauge control system of a rolling mill. 4,016,735, Cl. 72-9.000.

Peterson, Stig Arvid; and Lundquist, Sven Anders, to Boliden Aktiebolag. Smelting and reduction of oxidic and sulphated lead material. 4,017,308, Cl. 75-77.000.

Petrille, Dennis G., to Standard Oil Company (Indiana). Borontrifluoride recovery from alkyl phenol mixture. 4,017,548, Cl. 260-606.50B.

Pfeiffer, Heinrich: *See*—
Dieffenbacher, Gerhard; and Pfeiffer, Heinrich, 4,017,248.

Pfizer Inc.: *See*—
Kadin, Saul B., 4,017,625.

Pfleiderer, Hans: *See*—
Eisele, Ignaz; Pfleiderer, Hans; and Preuss, Ekkehard, 4,017,884.

Pfluger Apparatebau GmbH & Co. KG: *See*—
Pfluger, Ulrich; and Waterkotte, Klemens, 4,016,929.

Pfluger, Ulrich; and Waterkotte, Klemens, to Pfluger Apparatebau GmbH & Co. KG. Heat-exchanger. 4,016,929, Cl. 165-159.000.

Phillips, David C.: *See*—
Smith, James D. B.; and Phillips, David C., 4,016,745.

Phillips Petroleum Company: *See*—
Bailey, Fay W., 4,017,450.
Doss, Richard C., 4,017,467.
Johnson, Marvin M.; and Nowack, Gerhard P., 4,017,424.
Rion, Pat F., 4,017,446.

Picard, Jean Louis: *See*—
Callens, Paul Raymond; Picard, Jean Louis; and Poulet, Alain Jean, 4,017,688.

Pichey, Paul J. Intersection emergency warning system. 4,017,825, Cl. 340-32.000.

Pichl, Heinz. Device for driving a boat propeller and cooling water pump. 4,016,825, Cl. 115-17.000.

Pien, Hsia-Si, to Consolidated Controls Corporation. Pressure transducer. 4,017,819, Cl. 338-4.000.

Pierson, Joseph E.; and Stookey, Stanley D., to Corning Glass Works. Photosensitive colored glasses. 4,017,318, Cl. 106-52.000.

Pihlaja, Eino. Artificial hand. 4,016,607, Cl. 3-12.000.

Pihlaja, Eino; and Hirvasoja, Risto. Ice fishing device. 4,016,670, Cl. 43-17.000.

Pilcher, Robert Dwayne. Steering converter apparatus. 4,017,094, Cl. 280-404.000.

Pinsonnault, Maurice. Ski harness. 4,017,096, Cl. 280-615.000.

Pinter, Ladislaus: *See*—
Beriger, Ernst; and Pinter, Ladislaus, 4,017,611.

Pipeline Dehydrators, Inc.: *See*—
Powers, Marvin D., 4,016,620.

Pipes, George R., to Eaton Corporation. Shuttle assembly for a load handling apparatus. 4,016,984, Cl. 214-1.0BB.

Pirc, Vladimir Valentine: *See*—
Maher, Francis William, Jr.; and Pirc, Vladimir Valentine, 4,016,828.

Pirotte, Franz Lucien Ghislain, to U.S. Philips Corporation. Method of making a resistor. 4,016,646, Cl. 29-613.000.

Pisanchyn, John: *See*—
O'Brien, John B.; Pisanchyn, John; and Colby, S. Robert, 4,017,301.

Placontrol, Inc.: *See*—
Chodorow, Ingram S., 4,016,892.

Plastipak Packaging: *See*—
Frazer, John S., 4,016,995.

Plate, John R.; and Heisig, Charles P., to Allis-Chalmers Corporation. Hydrostatic load sensitive regenerative steering system. 4,016,949, Cl. 180-160.000.

Poehlein, Raymond E., to Xerox Corporation. Transfer-fusing speed compensation. 4,017,065, Cl. 271-80.000.

Pohto, Gerald R., to Diamond Shamrock Corporation. Bipolar electrode for an electrolytic cell. 4,017,375, Cl. 204-255.000.

Polansky, Robert G.: *See*—
Wallis, David E., Jr.; Polansky, Robert G.; and Rahm, Peter R., 4,016,942.

Polaroid Corporation: *See*—
Coughlan, Edward H.; and Whiteside, George D., 4,017,876.
Shenk, Edwin K.; and Muggli, Juerg, 4,017,873.

Polhemus Navigation Sciences, Inc.: *See*—
Kuipers, Jack, 4,017,858.

Pollet, Robert Joseph: *See—*
De Cat, Arthur Henri; Danckaert, Valere Frans; Sels, Francis Jeanne; and Pollet, Robert Joseph, 4,017,473.

Pommerening, Uwe A.: *See—*
Richards, Glenn L.; and Pommerening, Uwe A., 4,017,689.

Pond, David Martin, to Eastman Kodak Company. Benzoxazole ultraviolet stabilizers and their use in organic compositions. 4,017,508, Cl. 260-307.00D.

Pone, John, Jr.; Schrupp, Kenneth B.; Gilligan, Patrick J.; Harvey, Ronald B.; and Jensen, Gerald A., to Pako Corporation. Automatic density control. 4,017,179, Cl. 355-68.000.

Ponomarev, Nikolai Alexeevich: *See—*
Paton, Boris Evgenievich; Lakomsky, Viktor Iosifovich; Torkhov, Gennady Fedorovich; Trigub, Vladimir Kirillovich; Sheiko, Ivan Vasilievich; Verkhovtsev, Emil Vasilievich; Bakumenko, Sergei Panteleevich; Ponomarev, Nikolai Alexeevich; and Kuzmin, Anatoly Alexandrovich, 4,017,672.

Porter, Allan William Henry, to Aktiengesellschaft Adolph Saurer. Device for fastening the reed to the slay of a loom. 4,016,909, Cl. 139-188.00R.

Porter, Arthur Paul; Morris, James William; and Gasson, Roy Alfred George, to Redifon Limited. Video ground-based flight simulation apparatus. 4,016,658, Cl. 35-12.00N.

Poschadel, Werner: *See—*
Wimmer, Leopold; Hofgen, Gunter; and Poschadel, Werner, 4,017,861.

Potter, Terry Clair: *See—*
Braker, Frederick William; Heckman, Russell William; Nickey, George Allen; and Potter, Terry Clair, 4,016,706.

Poulet, Alain Jean: *See—*
Callens, Paul Raymond; Picard, Jean Louis; and Poulet, Alain Jean, 4,017,688.

Powell Electrical Manufacturing Company: *See—*
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Power Parts Company: *See—*
Sasgen, Peter J., 4,017,136.

Powers, Marvin D., to Pipeline Dehydrators, Inc. Pipeline cleaning pig. 4,016,620, Cl. 15-104.06R.

Powers, Robert H., to Itek Corporation. Device for preventing fogging of film within a camera back. 4,017,877, Cl. 354-277.000.

Powley, Wayne C.: *See—*
Soures, Nicholas M.; Patterson, James W.; and Powley, Wayne C., 4,017,067.

PPG Industries, Inc.: *See—*
Brand, Jay J., 4,016,969.
DeMajistre, Robert, 4,017,649.
Gillery, Frank H., 4,017,661.
Gruber, Gerald W., 4,017,652.
Jensen, Thomas H., 4,017,287.
Jerabek, Robert D.; Marchetti, Joseph R.; and Zwack, Robert R., 4,017,438.
Milam, Joseph E.; and Carlson, Gordon A., 4,017,551.

Prazska akumulatorka, narodni podnik: *See—*
Sandera, Josef; Calabek, Milan; Kouril, Oldrich; Cenek, Miroslav; Vanacek, Josef; Malik, Jiri; and Koudelka, Vojtech, 4,017,665.

Precision Metalsmiths, Inc.: *See—*
Simmons, John H.; and Daugherty, Donald A., 4,016,922.

Presco International, Inc.: *See—*
Sandnes, Edward S., 4,017,111.

Press, Henry. Combined reamer and screwdriver. 4,016,614, Cl. 7-14.10R.

Pressman, Gerald L.; and Casanova, John V., to Electroprint, Inc. Electrostatic line printer. 4,016,813, Cl. 101-426.000.

Presto Products, Incorporated: *See—*
Schwarz, Eckhard C. A., 4,017,452.

Preuss, Ekkehard: *See—*
Eisele, Ignaz; Pfleiderer, Hans; and Preuss, Ekkehard, 4,017,884.

Pricemaster Ltd.: *See—*
Thomas, James Ernest, 4,017,350.

Prigge, Helmut: *See—*
Deinhammer, Wolfgang; Vulic, Marco; Wick, Manfred; and Prigge, Helmut, 4,017,613.

Priola, Aldo: *See—*
Cesca, Sebastiano; Priola, Aldo; and Ferraris, Giuseppe, 4,017,553.

Prochazka, Svante: *See—*
Greskovich, Charles D.; and Prochazka, Svante, 4,017,319.

Procter & Gamble Company, The: *See—*
Bradley, William Jack, 4,017,412.
Demessemaekers, Emiel Mathilde Anna Alfons; Bognolo, Guido; and Spadini, Gianfranco Luigi, 4,017,409.
Diehl, Francis Louvaine; Marsan, Mario Stephen; and Edwards, James Byrd, 4,017,411.
DiGiulio, David Neil, 4,017,641.

Proctor, David, to United States of America, Navy. Mode-launcher for simulated waveguide. 4,017,864, Cl. 343-767.000.

Provost, Philip J.: *See—*
Hilleman, Maurice R.; Miller, William J.; and Provost, Philip J., 4,017,601.

Prueter, Albert H., Jr.: *See—*
O'Connell, Ronald B.; and Prueter, Albert H., Jr., 4,017,239.

Przirembel, Hans Rainer, to United Technologies Corporation. Turbomachinery vane or blade with cooled platforms. 4,017,213, Cl. 416-97.00A.

Psaar, Hubertus: *See—*
Brack, Alfred; and Psaar, Hubertus, 4,017,484.

PSC Technology, Inc.: *See—*
Wohlrab, Hans Chr., 4,017,178.

Pucel, Robert A.; and Benjamin, James A., to Raytheon Company. Overlay metallization field effect transistor. 4,016,643, Cl. 29-571.000.

Puchko, Alexandr Vladimirovich; Klushin, Valery Alexandrovich; Andreev, Georgy Vasilievich; Gorbunov, Eduard Matveevich; Makushok, Evgeny Markellovich; Schukin, Valery Yakovlevich; and Segal, Vladimir Mironovich. Traverse wedge forming machine. 4,016,738, Cl. 72-90.000.

Puchosic, John Edward, to Johns-Manville Corporation. Method of vacuum packaging compressible materials and apparatus. 4,016,707, Cl. 53-24.000.

Pugliese, Antonio, to Shap, Inc. Seam folding and pressing attachment for sewing machines. 4,016,822, Cl. 112-217.000.

Pullman Incorporated: *See—*
Lopker, Edwin B., 4,017,399.

Purcell, Bruce K.: *See—*
Holmes, Jeffrey W.; Purcell, Bruce K.; Franz, William F.; and Cole, Edward L., 4,017,263.

Q-Panel Company: *See—*
Albee, Percy Frederick, Jr., 4,017,049.

Quaker Oats Company, The: *See—*
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Quinlan, John J.: *See—*
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Quinn, Daniel G.: *See—*
Tiffin, Joseph B.; Quinn, Daniel G.; and Vroonland, Evart J., 4,016,688.

Quirk, James F., to Westinghouse Electric Corporation. Technique for compression sealing electrical conductors in a right circular cylinder resin casting. 4,017,568, Cl. 264-27.000.

R B Toy Development Co.: *See—*
Kupperman, Sam; and Kupperman, Dennis I., 4,016,891.

R. T. Vanderbilt Company, Inc.: *See—*
Beadle, Howard C.; and Brooks, Lester A., 4,017,439.

Rabeler, Thorwald; and Weltersbach, Wolfgang, to U.S. Philips Corporation. Circuit arrangement for separating video and audio signals. 4,017,676, Cl. 358-196.000.

Racki, Jerome G.: *See—*
Hawk, Robert M.; and Racki, Jerome G., 4,017,013.

Radev, Hristo Kirilov, to VMEI "Lenin" -NIS. Method of and apparatus for checking the cylindricity of a test surface. 4,016,747, Cl. 73-37.900.

Radiometer A/S: *See—*
Aas, Flemming; and Jensen, Ole Dollerup, 4,017,374.

Raetzel, Charlotte; and Tihanyi, Jenoe, to Siemens Aktiengesellschaft. Integrated circuits and method of producing the same. 4,017,769, Cl. 361-419.000.

Rahm, Peter R.: *See—*
Wallis, David E., Jr.; Polansky, Robert G.; and Rahm, Peter R., 4,016,942.

Raitport, Eli. Spray container. 4,017,008, Cl. 222-94.000.

Ralph M. Parsons Company: *See—*
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Ralston Purina Company: *See—*
Hoer, Ralph A.; and Stewart, Michael H., 4,017,646.

Ralston, Robert A.: *See—*
Gordon, John Edson; and Ralston, Robert A., 4,017,501.

Randolph, Richard D. System for verifying credit status. 4,017,835, Cl. 340-152.00R.

Ranzanigo, Pierluigi, to Bassani Ticino S.p.A. Fuse strips. 4,017,817, Cl. 337-290.000.

Rapp, James R., to Owens-Illinois, Inc. Glass-ceramics and process for making same. 4,017,317, Cl. 106-39.600.

Rauth, Peter: *See—*
Grosse-Wortmann, Haas; Hentschel, Bernhard; Rauth, Peter; Schoenberg, Karl-Heinz; Terwiesch, Bernd; and Winter, Hermann, 4,017,445.

Ravagnani, Frederick Joseph, to Firestone Tire & Rubber Company, The. Tire ply steer control. 4,016,916, Cl. 152-361.00R.

Ravasio, Dino: *See—*
Papinchak, Michael J.; and Ravasio, Dino, 4,017,241.

Rawstron, William W., to Jamesbury Corporation. Tank bottom internal valve housing. 4,016,907, Cl. 137-797.000.

Ray, Homer A., Jr., to Continental Electronics Manufacturing Co. Log sequential antennas. 4,017,866, Cl. 343-792.500.

Ray, Ronald C., to Tech Serv Inc. Modular animal cage. 4,016,833, Cl. 119-17.000.

Rayburn, Charles Calvin, to Illinois Tool Works Inc. Thermal switch device and method of making. 4,017,818, Cl. 337-403.000.

Raychem Corporation: *See—*
Whitney, Wells; and Horsma, David August, 4,017,715.

Raygo Wagner, Inc.: *See—*
Larsen, Richard L.; and Robnett, James J., 4,016,992.

Raymond Lee Organization, Inc., The: *See—*
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Levesque, Alston L., 4,016,875.
Lorkowski, Jonathan L., 4,017,103.
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Raytheon Company: *See—*
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RCA Corporation: *See—*
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Baker, Alfred Lynn, 4,017,678.

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Kannam, Peter Joseph; and Bennett, Wilfred Potter, 4,017,882.
Kaplan, Gerald Stanley; and Ritzie, Andrew David, 4,017,719.
Sheng, Abel Ching Nam, 4,017,747.
Staebler, David Lloyd, 4,017,144.
Woodward, Oakley McDonald, 4,017,865.

Reavis, Robert Philmore, Jr.; and Soderstrom, Melvin Andrew, to AMP Incorporated. Wire-in-slot electrical connections. 4,017,140, Cl. 339-98.000.

Redifon Limited: *See—*
Porter, Arthur Paul; Morris, James William; and Gasson, Roy Alfred George, 4,016,658.

Redlake Corporation: *See—*
Toombs, Harold G.; and Sullivan, Royce R., 4,017,898.

Reed, Dale H.; and Hardison, Jack E., to Atlantic Richfield Company. Marine gas exploder. 4,016,952, Cl. 181-118.000.

Reed Tool Company: *See—*
Wohlfeld, William I., 4,016,944.

Rees, Herbert: *See—*
Penkman, Dave; and Rees, Herbert, 4,017,236.

Reese, Richard G., to Combustion Power Company, Inc. Method and apparatus for removing finely divided solids from gas. 4,017,278, Cl. 55-96.000.

Reeves, Adam A. Stack gas treatment. 4,017,586, Cl. 423-242.000.

Rege, James R.: *See—*
White, James F.; and Rege, James R., 4,017,423.

Regie Nationale des Usines Renault: *See—*
Galas, Jacques; and Marie, Daniel, 4,016,773.

Reichenberger, Helmut, to Siemens Aktiengesellschaft. Signal collector system. 4,016,869, Cl. 128-2.10E.

Reighter, David H., to I-T-E Imperial Corporation. Void free electrical cement-concrete. 4,017,321, Cl. 106-98.000.

Reiling, Victor G.: *See—*
Freed, Jacob B.; and Reiling, Victor G., 4,017,576.

Reimann, Hans, to Schering Corporation. Novel monoesters of rosamicin. 4,017,516, Cl. 260-343.000.

Remer, Robert K., to Hull-Smith Chemicals, Inc. Pigment composition. 4,017,325, Cl. 106-288.00Q.

Remington Arms Company, Inc.: *See—*
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Renkey, Albert Lajos; and Engelhardt, Hans-Peter, to Magnesital-Feuerfest GmbH. Fireproof stamping mass for tap spouts and flues in blast furnaces. 4,017,316, Cl. 106-15.0FP.

Renz, Mical C.: *See—*
Heilman, William J.; Peterson, Frank C.; Renz, Mical C.; and Theard, Leslie P., 4,017,453.

Research Corporation: *See—*
Glasser, Wolfgang Gerhard; and Hsu, Oscar Hsien-Hsiang, 4,017,474.
Loberg, Michael Dewey; Callery, Patrick Stephen; and Cooper, Malcolm, 4,017,596.
Murray, David George; and Somerset, James Henry, 4,016,606.
Subramanian, Gopal; and McAfee, John Gilmour, 4,017,595.

Resnick, Charles; and Zant, Fred, to Lesney Products Corporation. Miniature toy vehicle launcher for launching a toy vehicle under the influence of gravity. 4,016,674, Cl. 46-202.000.

Ressa, Rick P. Threading device. 4,017,011, Cl. 223-102.000.

Revlon, Inc.: *See—*
Smiley, Alan Michael, 4,016,888.

Rey, Bernard: *See—*
Pean, Pierre Jean-Louis; Mauroux, Josette Andree; and Rey, Bernard, 4,017,196.

Reynolds, John H., to Monsanto Company. Unitized solid phase immunoassay kit and method. 4,017,597, Cl. 424-1.500.

Rhone-Poulenc-Textile: *See—*
Barbey, Jacques, 4,017,580.
Guillermin, Rene; Joly, Jean; and Sangalli, Sylvio, 4,016,626.

Riat, Henri: *See—*
Hegar, Gert; and Riat, Henri, 4,017,477.

Riccio, Pasquale R., to Ciba-Geigy Corporation. Single dose air pressure operated dispenser. 4,017,007, Cl. 222-80.000.

Rice, Edwin Eugene, to Ingersoll-Rand Company. Method for fastener tensioning. 4,016,938, Cl. 173-1.000.

Rice, John H., to United States of America, Navy. Temperature compensated, high resolution pressure transducer based on capacitance change principles. 4,016,764, Cl. 73-398.00C.

Rice, Warren A.; Vinton, Clarence S.; and Norris, Hugh Richard, to Chemotronics International, Inc. Method of producing three dimensional skeletal structures. 4,017,570, Cl. 264-42.000.

Rice, Warren A.; Vinton, Clarence S.; and Norris, Hugh Richard, to Chemotronics International, Inc. Method of producing three dimensional skeletal structures. 4,017,571, Cl. 264-42.000.

Richard, Laurey J.: *See—*
Brown, Roger S.; Shepard, Charles L.; and Richard, Laurey J., 4,016,629.

Richards, Glenn L.; and Pommerening, Uwe A., to Stromberg-Carlson Corporation. Digit analysis system for private automatic branch exchange telephone system. 4,017,689, Cl. 179-18.0EB.

Richardson, Cletus. Structural members for panel wall and glazing systems. 4,016,690, Cl. 52-238.000.

Richardson, David A.; and Robinson, Robert J., to Foxboro Company, The. Positioning device using negative spring-rate tensioning means. 4,016,721, Cl. 60-528.000.

Richardson-Merrell Inc.: *See—*
Parker, Roger Alan, 4,017,514.

Richter Gedeon Vegyeszeti Gyar Rt.: *See—*
Hideg, Kalman; Hankovszky, Olga; Palosi, Eva; Hajos, Gyorgy; and Szporny, Laszlo, 4,017,507.

Riedel, Ronald J., to Hewlett-Packard Company. Low frequency triangular waveform generator. 4,017,801, Cl. 328-35.000.

Rion, Pat F., to Phillips Petroleum Company. Frictionally stable emulsions. 4,017,446, Cl. 260-29.7GP.

Rioux, Jacques E.; Turp, Gerald; and Jacques, Francois, to Centre de Recherche Industrielle du Quebec. Instrument for use in laparoscopic tubal cauterization. 4,016,881, Cl. 128-303.170.

Riseman, Jacob: *See—*
Ho, Irving T.; and Riseman, Jacob, 4,017,883.

Risseeuw, Johannis I.: *See—*
Penard, Herbert F. L.; and Risseeuw, Johannis I., 4,017,592.

Ritzie, Andrew David: *See—*
Kaplan, Gerald Stanley; and Ritzie, Andrew David, 4,017,719.

Ro, Rolland Shin-Yuan: *See—*
Collette, John Wilfred; Ro, Rolland Shin-Yuan; and Sonnenberg, Fred Max, 4,017,669.

Robbins, Daniel H., to Itek Corporation. Photosensitive material positioning system. 4,017,182, Cl. 355-74.000.

Robert Bosch G.m.b.H.: *See—*
Jons, Claus, 4,017,224.
Maisch, Wolfgang, 4,017,765.

Roberto, Francisco Q.: *See—*
Geisler, Robert L.; Crelier, Arnold M.; and Roberto, Francisco Q., 4,017,342.

Roberts, Goodwin N. Table baseball game. 4,017,074, Cl. 273-89.000.

Robertshaw Controls Company: *See—*
Bible, Harley V., 4,016,853.
Bible, Harley V.; and Moon, William T., Jr., 4,017,054.
Koch, Erich O., 4,017,778.

Robinson, Charles C., to American Optical Corporation. Mold for casting contact lenses utilizing and electron beam to polymerize the resin lens. 4,017,238, Cl. 425-174.600.

Robinson, Charles J.: *See—*
English, William A.; and Robinson, Charles J., 4,017,286.

Robinson, Robert J.: *See—*
Richardson, David A.; and Robinson, Robert J., 4,016,721.

Robnett, James J.: *See—*
Larsen, Richard L.; and Robnett, James J., 4,016,992.

Robugen GmbH, Pharmazeutische Fabrik: *See—*
Gauri, Kailash Kumar, 4,017,626.

Roche, Bernard G.; Majos, Jacques; and Lardy, Jean-Louis A. Synthesizer of multifrequency code signals. 4,017,693, Cl. 179-84.0VF.

Rockwell International Corporation: *See—*
Barclay, Kenneth M.; Birk, James R.; and Parkins, William E., 4,017,271.
Tannas, Lawrence E., Jr., 4,017,848.
Yoak, Gene A.; and McKay, Glenn E., 4,016,958.
Zavodny, Eugene N., 4,016,811.

Roe, Norman P.; and Brown, Gordon W., to Consolidated Products Corporation. Method for forming a sheathed electrical cable. 4,017,579, Cl. 264-174.000.

Roen, Stephen A., to Litton Business Systems, Inc. Solar powered portable calculator. 4,017,725, Cl. 235-152.000.

Roffler, Josua, to Sulzer Brothers Limited. Vessel for conveying a liquid/gas mixture. 4,016,997, Cl. 220-10.000.

Rogall, Eugene W.: *See—*
Hsieh, Paul Y.; and Rogall, Eugene W., 4,017,366.

Roger & Gallet: *See—*
Cazorla, Jean; and Tillon, Yves, 4,017,602.

Rogers, Bruce J., to Sperry Rand Corporation. Phase locked oscillator. 4,017,806, Cl. 331-1.00A.

Rogers, Delmar R., to United Steel Products Co. Bracing for stud walls. 4,016,698, Cl. 52-656.000.

Rogers, Edward F.; Ashton, Wallace T.; and Dybas, Richard A., to Merck & Co., Inc. 1-(n-Octylthiocarbonyl)-2-(4-thiazolyl)benzimidazole. 4,017,505, Cl. 260-302.00H.

Rogers, Edward F.: *See—*
Ashton, Wallace T.; and Rogers, Edward F., 4,017,503.
Ashton, Wallace T.; and Rogers, Edward F., 4,017,504.

Rohe, Lothar; Schramm, Jurgen; Klauke, Erich; Eue, Ludwig; and Schmidt, Robert Rudolf, to Bayer Aktiengesellschaft. Halogenated 4-trifluoromethyl-diphenyl-ether herbicidal compositions. 4,017,300, Cl. 71-98.000.

Rohm and Haas Company: *See—*
Gehman, David R.; and Fiarman, Irwin S., 4,017,662.
Killam, H. Scott, 4,017,440.

Rolleberg, Kjell Ove: *See—*
Assow, Bengt Holger; and Rolleberg, Kjell Ove, 4,017,783.

Rolls-Royce (1971) Limited: *See—*
Bell, John Kenneth Alexander; and Fuller, John Rodney Dyson, 4,017,207.

Romeas, Rene: *See—*
Oprandi, Pierre; and Romeas, Rene, 4,017,895.

Romrell, Delwin M., to United States of America, Energy Research and Development Administration. Circuit for measuring time differences among events. 4,017,794, Cl. 324-78.00D.

Roosild, Sven A.: *See—*
Davies, D. Eirug; Roosild, Sven A.; and Dolan, Russell P., Jr., 4,017,887.

Rosemount Inc.: *See—*
Grindheim, Earl A., 4,016,763.

Rosenau, Gordon G. Fishing rod holder apparatus. 4,017,050, Cl. 248-534.000.

Rosenthal, Robert D., to Neotec Corporation. Optical analysis of biomedical specimens. 4,017,192, Cl. 356-201.000.

Rosing, George Leonard, to General Telephone Company of California. Guard circuit for ground start telephone equipment. 4,017,690, Cl. 179-18.0AH.

Ross, Bernd, to Illinois Tool Works Inc. Humidity sensor with multiple electrode layers separated by a porous monolithic ceramic dielectric structure. 4,017,820, Cl. 338-35.000.

Ross, Gerald Fred, to Sperry Rand Corporation. Apparatus for angular measurement and beam forming with baseband radar systems. 4,017,854, Cl. 343-16.00R.

Ross, Henry M. Water purification system utilizing ultraviolet radiation. 4,017,734, Cl. 250-431.000.

Ross, Henry M. Air purification system utilizing ultraviolet radiation. 4,017,736, Cl. 250-435.000.

Rossetti, Vittorio: *See—*
Marsili, Leonardo; Rossetti, Vittorio; and Pasqualucci, Carmine, 4,017,481.

Rossi, Arlene M. Dolbin, executor: *See—*
Gerrity, Robert John; Wandrey, Clarence Dwight; and Dolbin, Benjamin Howard, deceased, 4,017,718.

Roteman, Robert, to Abbott Laboratories. Method for making aminoacid amides. 4,017,513, Cl. 260-326.200.

Rouam, Jean Simon Rene, to Societe d'Etudes de Machines Thermiques. Safety control method and device for limiting the temperature of a fluid to a given upper value. 4,016,851, Cl. 123-198.00D.

Rouquaud, Richard: *See—*
Lenglin, Thierry; Lissillour, Albert; Desaunay, Jean-Louis; Le Corvec, Robert; Simonneau, Robert; and Rouquaud, Richard, 4,017,134.

Rovac Corporation, The: *See—*
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Rowland, Stanley P.: *See—*
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Royal Business Machines, Inc.: *See—*
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Rozhdestvensky, Jury Lvovich: *See—*
Lapin, Vladimir Viktorovich; Bulgakov, Boris Sergeevich; Bogoyavlensky, Konstantin Nikolaevich; Rozhdestvensky, Jury Lvovich; Granosky, Simon Pavlovich; Maizelis, Genrikh Semenovich; Lazutin, Vladimir Ivanovich; and Sauskan, Ilya Alexandrovich, 4,016,739.

Rozzell, Thomas C.; Johnson, Curtis; Durney, Carl; and Lords, James, to United States of America, Navy. Optical temperature probe. 4,016,761, Cl. 73-356.000.

Rubbermaid Incorporated: *See—*
Nelson, Robert F., 4,017,240.

Rubino, Andrew M., to Armour Pharmaceutical Company. Aluminum-zirconium anti-perspirant systems with salts of amino acids. 4,017,599, Cl. 424-47.000.

Runciman, Herbert Morrison, to Barr and Stroud Limited. Radiation scanning system. 4,017,732, Cl. 250-334.000.

Ruppert, Jurgen: *See—*
Sauer, Gerhard; Lorenz, Hans Peter; Eder, Ulrich; Haffer, Gregor; Ruppert, Jurgen; and Wiechert, Rudolf, 4,017,545.

Rusbach, Maurice, to Sarmac S.A. Portable firearm with a retractable barrel. 4,016,800, Cl. 89-177.000.

Rusch, William T., to United States of America, Navy. Bearing determining apparatus including single channel multiplexing. 4,017,822, Cl. 340-2.000.

Rusco Industries, Inc.: *See—*
Ellefson, Clarence L., deceased, 4,016,679.

Russell, Peter B.: *See—*
Yardley, John P.; and Russell, Peter B., 4,017,637.

Ryan, Mark D.: *See—*
Kilian, Thomas M.; and Ryan, Mark D., 4,017,845.

Rychlik, Frank J. Inertia fuel separator and vaporizer. 4,016,847, Cl. 123-122.0AA.

Ryer, Jack: *See—*
Brois, Stanley J.; Ryer, Jack; and Winans, Esther, 4,017,406.

Ryzhkov, Nikolai Stepanovich; Nikolaev, Viktor Petrovich; Krylov, Viktor Alexeevich; Ioffe, Leonid Yakovlevich; Krotov, Veniamin Vasilievich; and Derzhavets, Jury Adolfovich. Ship reduction gear for contrarotating screws. 4,016,777, Cl. 74-665.00K.

S.T. Dupont: *See—*
Tallonneau, Georges, 4,017,252.

Saaty, Samir N.: *See—*
Magone, Raymond L.; and Saaty, Samir N., 4,017,572.

Sagami Chemical Research Center: *See—*
Isowa, Yoshikazu; and Kurita, Hideaki, 4,017,512.
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Saifer, Mark G.: *See—*
Huber, Wolfgang; Saifer, Mark G.; and Williams, Lewis D., 4,017,605.

Saiki, Atsushi: *See—*
Tomono, Masami; Abe, Akira; Harada, Seiki; Sato, Kikuji; Takagi, Takeshi; Kamoshita, Genichi; Oya, Yuichiro; and Saiki, Atsushi, 4,017,886.

St-Amour, Lionel. Screwdriver for slotted head screw. 4,016,912, Cl. 145-50.00A.

St. John, Richard C., to Aspro, Incorporated. Centrifugal clutch construction. 4,016,963, Cl. 192-105.0BA.

St. John, Richard C.: *See—*
Kraft, Derald H.; and St. John, Richard C., 4,016,642.

Saito, Kazuyuki: *See—*
Ishida, Nobuhiro; and Saito, Kazuyuki, 4,017,451.

Sakamaki, Hisashi: *See—*
Komori, Shigehiro; Sakamaki, Hisashi; Hattori, Hiroyuki; Iida, Toshihide; Miyamoto, Koichi; and Umezawa, Kazumi, 4,017,170.
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Sakamoto, Yoshio: *See—*
Seki, Kunio; Suzuki, Yukio; and Sakamoto, Yoshio, 4,017,749.

Sakota, Mitsushi. Signboard using marcromolecular elastomer having adhesive layer. 4,016,665, Cl. 40-135.000.

Salazar, Charles. Strike plate for spring bolt door latches. 4,017,106, Cl. 292-340.000.

Salisbury, Charles W.: *See—*
Fein, Michael E.; and Salisbury, Charles W., 4,017,808.

Salmon, Michel: *See—*
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Sand, Leonard B.: *See—*
Cormier, William E.; and Sand, Leonard B., 4,017,590.

Sander, Nils Borje Lennart: *See—*
Anderberg, Paul-Henry Botvid; Hambitzer, Hans Gunnar Gunther; and Sander, Nils Borje Lennart, 4,016,755.

Sandera, Josef; Calabek, Milan; Kouril, Oldrich; Cenek, Miroslav; Vanacek, Josef; Malik, Jiri; and Koudelka, Vojtech, to Prazska akumulatorka, narodni podnik. Composition for a zinc electrode. 4,017,665, Cl. 429-229.000.

Sanders, David E.: *See—*
Gordy, Robert S.; Anderson, Alfred T.; and Sanders, David E., 4,017,798.

Sanders, David H., to M. H. Sanders et al. Water spider. 4,016,826, Cl. 115-26.000.

Sanders, William H. Hand-size fluid-powered tool reciprocator. 4,016,941, Cl. 173-170.000.

Sandnes, Edward S., to Presco International, Inc. Safety hook. 4,017,111, Cl. 294-82.00R.

Sando Iron Works Co., Ltd.: *See—*
Sando, Yoshikazu; Ishidoshiro, Hiroshi; and Minakata, Matsuo, 4,017,258.

Sando, Yoshikazu; Ishidoshiro, Hiroshi; and Minakata, Matsuo, to Sando Iron Works Co., Ltd. Method of forming a pressure seal employing an air-balance in a high pressure steamer. 4,017,258, Cl. 8-149.300.

Sandoz, Inc.: *See—*
Bruner, James D., 4,016,885.
Hardtmann, Goetz E.; and Coppola, Gary M., 4,017,499.

Sandoz Ltd.: *See—*
Dore, Jacky, 4,017,478.

Sanford, Steve Douglas; Chenoweth, Vaughn Charles; and Faulkner, Duane Harold, to Johns-Manville Corporation. Furnace outlet. 4,017,294, Cl. 65-326.000.

Sangalli, Sylvio: *See—*
Guillermin, Rene; Joly, Jean; and Sangalli, Sylvio, 4,016,626.

Sanka, Tsugio: *See—*
Yoshioka, Yuichi; and Sanka, Tsugio, 4,016,838.

Sankyo Company Limited: *See—*
Hiraoka, Tetsuo; and Sugimura, Yukio, 4,017,488.

Sanno, Yasushi: *See—*
Murata, Tadakazu; Nohara, Akira; Sugihara, Hirosada; and Sanno, Yasushi, 4,017,517.

Sanyo Electric Co., Ltd.: *See—*
Takahara, Ichiro; Toyoshima, Yoshiharu; and Yamamoto, Yuzo, 4,017,892.

Saori, Hideo: *See—*
Iida, Tetsuya; Saori, Hideo; Inoguchi, Masao; and Tominaga, Hiroo, 4,017,379.

Sardos, Rene, to Agence Nationale de Valorisation de la Recherche (ANVAR). Polarization analyzers and duplexers. 4,017,153, Cl. 350-152.000.

Sarmac S.A.: *See—*
Rusbach, Maurice, 4,016,800.

Sasajima, Kikuo: *See—*
Maruyama, Isamu; Nakao, Masaru; Sasajima, Kikuo; Inaba, Shigeho; and Yamamoto, Hisao, 4,017,624.

Sasgen, Peter J., to Power Parts Company. Permanent tri-headed jumper cable for locomotives. 4,017,136, Cl. 339-28.000.

Sato, Haruyoshi: *See—*
Ishii, Kanji; and Sato, Haruyoshi, 4,017,733.

Sato, Hideo: *See—*
Inukai, Takashi; Sato, Hideo; Sugimori, Shigeru; and Ishibe, Tetsuya, 4,017,416.

Sato, Kikuji: *See—*
Tomono, Masami; Abe, Akira; Harada, Seiki; Sato, Kikuji; Takagi, Takeshi; Kamoshita, Genichi; Oya, Yuichiro; and Saiki, Atsushi, 4,017,886.

Sato, Masaaki, to Olympus Optical Co., Ltd. Cassette ejector for tape recorder. 4,017,902, Cl. 360-137.000.

Sato, Yoshiaki: *See—*
Kuwada, Yutaka; Meguro, Kanji; Tawada, Hiroyuki; Sohda, Takashi; Natsugari, Hideaki; and Sato, Yoshiaki, 4,017,620.

Satron, Inc.: *See—*
Looker, Robert, 4,016,911.

Sauer, George E., to General Electric Company. Impulse voltage distribution improving partial-turn electrostatic shields for disc windings. 4,017,815, Cl. 336-70.000.

Sauer, Gerhard; Lorenz, Hans Peter; Eder, Ulrich; Haffer, Gregor; Ruppert, Jurgen; and Wiechert, Rudolf, to Schering Aktiengesell-

schaft. Process for the preparation of bicycloalkane derivatives. 4,017,545, Cl. 260-590.0FA.

Saunders, William T., to National Steel Corporation. Ironing container stock manufacturing method. 4,017,367, Cl. 204-28.000.

Sauskan, Ilya Alexandrovich: *See*—
Lapin, Vladimir Viktorovich; Bulgakov, Boris Sergeevich; Bogoyavlensky, Konstantin Nikolaevich; Rozhdestvensky, Jury Lvovich; Granosky, Simon Pavlovich; Maizelis, Genrikh Semenovich; Lazutin, Vladimir Ivanovich; and Sauskan, Ilya Alexandrovich, 4,016,739.

Savit, Carl H.: *See*—
Dick, Charles W.; Johnston, Otis A.; Paitson, John L.; and Savit, Carl H., 4,016,951.

Sawatari, Takeo, to Bendix Corporation, The. Surface profile measuring device and method. 4,017,188, Cl. 356-120.000.

Sawyer, Webster M.: *See*—
Heath, James E.; and Sawyer, Webster M., 4,017,389.

Schade, Harvey R. Oil filter. 4,017,400, Cl. 210-439.000.

Schaefer Equipment Company: *See*—
Cale, Roland E., 4,016,691.

Schaffner, Heinz: *See*—
Arend, Gunter; Schaffner, Heinz; and Schramm, Jurgen, 4,017,564.

Schank, Richard L.; and Crystal, Richard G., to Xerox Corporation. Planographic printing master. 4,016,814, Cl. 101-467.000.

Schatz, Ralph Arthur: *See*—
McDonald, James Anthony; and Schatz, Ralph Arthur, 4,017,779.

Schaub, Robert Eugene; Floyd, Middleton Brawner, Jr.; and Weiss, Martin Joseph, to American Cyanamid Company. 16-Fluoro-11-deoxy-13-dihydro-prostaglandin. 4,017,534, Cl. 260-468.00D.

Schellenberg, Walter, to Max Sandherr AG. Box and method of covering a box edge. 4,016,807, Cl. 93-39.00C.

Schenk, Wolfgang: *See*—
Schmidt, Franz; Fahrbach, Gerhard; Schenk, Wolfgang; and Seiler, Erhard, 4,017,558.

Schenker, Karl: *See*—
Wilhelm, Max; Bernasconi, Raymond; Storni, Angelo; Beck, Dieter; and Schenker, Karl, 4,017,542.

Schering Aktiengesellschaft: *See*—
Sauer, Gerhard; Lorenz, Hans Peter; Eder, Ulrich; Haffer, Gregor; Ruppert, Jurgen; and Wiechert, Rudolf, 4,017,545.

Schering Corporation: *See*—
Mayer, Joseph; and Sherlock, Margaret H., 4,017,500.
Reimann, Hans, 4,017,516.

Schermesser, Andre, to Compagnie Generale d'Electricite. Device for triggering the discharge of flash tubes. 4,017,763, Cl. 315-240.000.

Schick-Kalb, Jurgen: *See*—
Unger, Klaus; and Schick-Kalb, Jurgen, 4,017,528.

Schiff, Peter. Electronic synchronizer-monitor system for controlling the timing of mechanical assistance and pacing of the heart. 4,016,871, Cl. 128-2.06R.

Schild, Kasimir W.; Fleming, Richard D.; and Harrington, Phil R., to GTE Automatic Electric Laboratories Incorporated. Method and apparatus for protecting memory storage location accesses. 4,017,840, Cl. 340-172.500.

Schlogl, Gunter: *See*—
Stauff, Joachim; Jaeschke, Wolfgang; and Schlogl, Gunter, 4,017,260.

Schmidt, Felix Helmut: *See*—
Bosies, Elmar; Stach, Kurt; Schmidt, Felix Helmut; Heerdt, Ruth; and Weber, Helmut, 4,017,539.

Schmidt, Franz; Fahrbach, Gerhard; Schenk, Wolfgang; and Seiler, Erhard, to BASF Aktiengesellschaft. Thermoplastic molding compositions of high impact resistance. 4,017,558, Cl. 260-876.00B.

Schmidt, Gerhard, to Siemens Aktiengesellschaft. Circuit assembly as for a T-element. 4,017,821, Cl. 338-95.000.

Schmidt, Robert Rudolf: *See*—
Rohe, Lothar; Schramm, Jurgen; Klauke, Erich; Eue, Ludwig; and Schmidt, Robert Rudolf, 4,017,300.

Schmidt, Willi Johann, to Hoechst Aktiengesellschaft. Apparatus for increasing the production output of stretched flat film webs composed of thermoplastic material. 4,017,227, Cl. 425-66.000.

Schminke, Wolfgang; Stolting, Klaus; Macholdt, Hans; and Kunkler, Hans, to Hoechst Aktiengesellschaft. Process for the continuous manufacture of cellulose glycolate. 4,017,671, Cl. 536-98.000.

Schneehage, Hans Henning: *See*—
Koester, Eberhard; Wunsch, Gerd; Deigner, Paul; Stumpfi, Werner; and Schneehage, Hans Henning, 4,017,303.

Schneider, Fred J. Packer wheel construction. 4,016,934, Cl. 172-555.000.

Schneider, Kurt: *See*—
Bosche, Horst Guenter; Baer, Karl; and Schneider, Kurt, 4,017,494.

Schneider, Raymond P.; Marshall, James F.; and Crowell, Maclean, to United Technologies Corporation. Compressor construction. 4,016,636, Cl. 29-156.80R.

Schneider, Ronald A., to Chevron Research Company. Process for the manufacture of maleic anhydride using high surface area catalyst. 4,017,521, Cl. 260-346.80A.

Schoenberg, Karl-Heinz: *See*—
Grosse-Wortmann, Hans; Hentschel, Bernhard; Rauth, Peter; Schoenberg, Karl-Heinz; Terwiesch, Bernd; and Winter, Hermann, 4,017,445.

Schott, Walter: *See*—
Wick, Richard; Bestenreiner, Friedrich; Giglberger, Dieter; Wetzel, Gunter; Schott, Walter; V. Engeland, Josef Leonard; and Verlinden, Willy Gommaire, 4,017,171.

Schrade, Jochen: *See*—
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Schramm, Jurgen: *See*—
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Rohe, Lothar; Schramm, Jurgen; Klauke, Erich; Eue, Ludwig; and Schmidt, Robert Rudolf, 4,017,300.

Schrecongost, Ray B., to Hammond Corporation. Monophonic electronic musical instrument. 4,016,792, Cl. 84-1.010.

Schreiber, Klaus-Gunther, to Messrs. Berendsohn AG. Holder for a writing implement. 4,016,982, Cl. 211-69.100.

Schreiner, Siegfried: *See*—
Voelkl, Erfried; Schreiner, Siegfried; Wunsch, Gerd; Kiener, Volker; Waibel, Rudi; and Koester, Hartwig, 4,017,593.

Schreyer, Gerd: *See*—
Bittner, Friedrich; Haschke, Heinz; Suchsland, Helmut; Schreyer, Gerd; and Schwarze, Werner, 4,017,413.

Schrupp, Kenneth B.: *See*—
Pone, John, Jr.; Schrupp, Kenneth B.; Gilligan, Patrick J.; Harvey, Ronald B.; and Jensen, Gerald A., 4,017,179.

Schukin, Valery Yakovlevich: *See*—
Puchko, Alexandr Vladimirovich; Klushin, Valery Alexandrovich; Andreev, Georgy Vasilievich; Gorbunov, Eduard Matveevich; Makushok, Evgeny Markellovich; Schukin, Valery Yakovlevich; and Segal, Vladimir Mironovich, 4,016,738.

Schulz, Hans-Hermann: *See*—
Leusner, Bernd W.; and Schulz, Hans-Hermann, 4,016,650.

Schuster, Samuel J. Method and apparatus for making transverse closure seals in composite thermoplastic bag stock. 4,016,806, Cl. 93-35.00R.

Schwab, Frederick C.: *See*—
Murray, James G.; and Schwab, Frederick C., 4,017,476.

Schwalenstocker, Thomas H.; and Zitelli, William E., to Westinghouse Electric Corporation. Servo control system for electro-hydraulic inlet valves. 4,017,056, Cl. 251-131.000.

Schwartz, Bernard, to Sperry Rand Corporation. Double rotation inertial measurement apparatus. 4,017,187, Cl. 356-106.0LR.

Schwarz, Eckhard C. A., to Presto Products, Incorporated. Polymer modified hydrophilic inorganic fillers for thermoplastic polymeric materials. 4,017,452, Cl. 260-42.140.

Schwarze, Werner: *See*—
Bittner, Friedrich; Haschke, Heinz; Suchsland, Helmut; Schreyer, Gerd; and Schwarze, Werner, 4,017,413.

Scogin, Clifford A. Floor furnace heating system. 4,016,858, Cl. 126-116.00B.

Scott, Donald C. Solvent pumping system. 4,016,893, Cl. 134-115.00R.

Scott, John D.: *See*—
Conroy, Gary D.; and Scott, John D., 4,017,194.

Scott, Lawrence S.: *See*—
Walters, William D., 4,016,616.

Scott Paper Company: *See*—
Kolbach, Charles C., 4,016,628.

Scott, Samuel C.; and Wells, David R. Lightweight concrete beam form. 4,017,051, Cl. 249-50.000.

Scottish Agricultural Industries Limited: *See*—
Davidson, Eric, 4,017,588.

Scovill Manufacturing Company: *See*—
Shipp, John William; and Goodman, Paul Douglas, 4,016,900.
Thacker, Stephen Ernest William, 4,016,918.

Sealectro Corporation: *See*—
Nelson, Wilfred, 4,017,139.

Seaquist Valve Company, Div. of Pittway Corporation: *See*—
Ewald, Robert F.; and Normos, Norbert, 4,017,009.

Seeger, Gunter: *See*—
Keusgen, Heinz-Everhard; Seeger, Gunter; and Beyer, Reinhard, 4,017,233.

Segal, Vladimir Mironovich: *See*—
Puchko, Alexandr Vladimirovich; Klushin, Valery Alexandrovich; Andreev, Georgy Vasilievich; Gorbunov, Eduard Matveevich; Makushok, Evgeny Markellovich; Schukin, Valery Yakovlevich; and Segal, Vladimir Mironovich, 4,016,738.

Seidel, Peter, to Dragerwerk Aktiengesellschaft. Vaporizer for anaesthetics. 4,017,566, Cl. 261-56.000.

Seiler, Erhard: *See*—
Schmidt, Franz; Fahrbach, Gerhard; Schenk, Wolfgang; and Seiler, Erhard, 4,017,558.

Seilly, Alec Harry: *See*—
Jarrett, Boaz Antony; and Seilly, Alec Harry, 4,017,754.

Seki, Kunio; Suzuki, Yukio; and Sakamoto, Yoshio, to Hitachi, Ltd. Transistor circuit including source voltage ripple removal. 4,017,749, Cl. 307-296.00R.

Sekigawa, Fujio: *See*—
Ohno, Shigeru; Hoshi, Noboru; and Sekigawa, Fujio, 4,017,598.
Ohno, Shigeru; Hoshi, Noboru; and Sekigawa, Fujio, 4,017,647.

Sekiguchi, Masakichi: *See*—
Ishiwata, Junichi; Suzuki, Hideo; and Sekiguchi, Masakichi, 4,017,753.

Sellman, Donald L. Wind motors. 4,017,204, Cl. 415-2.000.

Sels, Francis Jeanne: *See*—
De Cat, Arthur Henri; Danckaert, Valere Frans; Sels, Francis Jeanne; and Pollet, Robert Joseph, 4,017,473.

Senghaas, Karl A.: *See*—
Hudson, Donald C.; Morris, Charles R.; Fleck, Horst G.; and Senghaas, Karl A., 4,017,737.

Setele, William O.; and Miller, Donald A., to Kendale Industries, Inc. Ball bearing assembly. 4,017,128, Cl. 308-174.000.

Settele, Wilhelm: *See*—
Michels, Martin; and Settele, Wilhelm, 4,017,673.

Setterquist, Robert Alton, to Du Pont de Nemours, E. I., and Company. Tetra(neophyl) zirconium. 4,017,525, Cl. 260-429.300.
Severson, Richard W. Arithmetic board game. 4,017,080, Cl. 273-135.00R.
Sexstone, John H., to Brown & Williamson Tobacco Corporation. Apparatus for dispensing spaced deposits of particulate material. 4,016,830, Cl. 118-406.000.
Shaffer, John W.: *See—*
Audesse, Emery G.; Colville, William T.; Shaffer, John W.; and Mecone, David W., 4,017,728.
Shaikh, Zafaruzzaman I.: *See—*
Shastri, Subramaniam; and Shaikh, Zafaruzzaman I., 4,017,615.
Shap, Inc.: *See—*
Pugliese, Antonio, 4,016,822.
Shastri, Subramaniam; and Shaikh, Zafaruzzaman I., to Syntex Corporation. Propylene carbonate ointment vehicle. 4,017,615, Cl. 424-241.000.
Shaw, Manuel; and Thatcher, Imbrie, to Interscan Corporation. Electrochemical sensing cell. 4,017,373, Cl. 204-195.00R.
Sheiko, Ivan Vasilievich: *See—*
Paton, Boris Evgenievich; Lakomsky, Viktor Iosifovich; Torkhov, Gennady Fedorovich; Trigub, Vladimir Kirillovich; Sheiko, Ivan Vasilievich; Verkhovtsev, Emil Vasilievich; Bakumenko, Sergei Panteleevich; Ponomarev, Nikolai Alexeevich; and Kuzmin, Anatoly Alexandrovich, 4,017,672.
Shell Oil Company: *See—*
Carey, James E., 4,017,432.
Heath, James E.; and Sawyer, Webster M., 4,017,389.
Sheng, Abel Ching Nam, to RCA Corporation. First timing circuit controlled by a second timing circuit for generating long timing intervals. 4,017,747, Cl. 307-293.000.
Shenk, Edwin K.; and Muggli, Juerg, to Polaroid Corporation. Exposure control system with braking capability. 4,017,873, Cl. 354-29.000.
Shepard, Charles L.: *See—*
Brown, Roger S.; Shepard, Charles L.; and Richard, Laurey J., 4,016,629.
Shepard, James N., to United States Steel Corporation. Flexible guiding track and release mechanism for an overhead rolling door assembly. 4,016,920, Cl. 160-133.000.
Sheridan, Richard C.: *See—*
McCullough, John F.; and Sheridan, Richard C., 4,017,589.
Sherlock, Margaret H.: *See—*
Mayer, Joseph; and Sherlock, Margaret H., 4,017,500.
Sherman, Michael I.: *See—*
Funk, Erwin D.; and Sherman, Michael I., 4,017,270.
Shiao, Shing-Jen. Method of activation of red mud. 4,017,425, Cl. 252-453.000.
Shibata, Hirotaka, to Yamaha, Hatsudoki Kabushiki Kaisha. Motorcycle with a water cooled engine. 4,016,945, Cl. 180-33.00R.
Shigemori, Hideto; and Fukunaga, Motoaki, to Glory Kogyo Kabushiki Kaisha. Sheet comparing system and comparator adapted for said system. 4,017,830, Cl. 340-146.200.
Shimamura, Hironori: *See—*
Hara, Hirohito; and Shimamura, Hironori, 4,017,787.
Shimizu, Masanao: *See—*
Minami, Shinsaku; Matsumoto, Jun-Ichi; Sugita, Minoru; Shimizu, Masanao; Takase, Yoshiyuki; and Nakamura, Shinichi, 4,017,622.
Shimizu, Misao: *See—*
Watanabe, Kazutaka; Shimizu, Misao; Ogawa, Toshio; Sugawara, Akihiro; and Inou, Kiyoharu, 4,017,828.
Shimozawa, Izuru: *See—*
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Shin-Etsu Chemical Company Limited: *See—*
Ohno, Shigeru; Hoshi, Noboru; and Sekigawa, Fujio, 4,017,598.
Ohno, Shigeru; Hoshi, Noboru; and Sekigawa, Fujio, 4,017,647.
Shin-Shirasuna Electric Corporation: *See—*
Katsurayana, Hiromasa, 4,017,900.
Shiokawa, Seiji. Press-forming apparatus. 4,016,742, Cl. 72-465.000.
Shionogi & Co., Ltd.: *See—*
Ishiguro, Takeo, 4,017,635.
Shipp, John William; and Goodman, Paul Douglas, to Scovill Manufacturing Company. Springless valve for pneumatic tires and the like. 4,016,900, Cl. 137-223.000.
Shofner, Frederick M.; and Kreikebaum, Gerhard, to Environmental Systems Corporation. Electro-optical method and system for in situ measurements of particulate mass density. 4,017,186, Cl. 356-103.000.
Showa Denko Kabushiki Kaisha: *See—*
Nakada, Hiroshi; and Kosuge, Yukio, 4,016,702.
Showa Oil Company, Ltd.: *See—*
Iida, Tetsuya; Saori, Hideo; Inoguchi, Masao; and Tominaga, Hiroo, 4,017,379.
Shumaker, Gerald C. Method of making a composite vehicle wheel. 4,017,348, Cl. 156-189.000.
Siebert, Larry D.: *See—*
Nolen, Robert L., Jr.; and Siebert, Larry D., 4,017,164.
Siegel, Arthur D. Ultraviolet liquid sterilizer. 4,017,735, Cl. 250-430.000.
Sielaff, Ulrich; and Peickert, Wilfried R., to Airco, Inc. Blood gas catheter. 4,016,864, Cl. 128-2.00G.
Siemens Aktiengesellschaft: *See—*
Eisele, Ignaz; Pfleiderer, Hans; and Preuss, Ekkehard, 4,017,884.
Raetzel, Charlotte; and Tihanyi, Jenoe, 4,017,769.
Reichenberger, Helmut, 4,016,869.
Schmidt, Gerhard, 4,017,821.
Sternat, Hugo, 4,017,829.
Sigler, Eugene B. Fire extinguisher enclosure. 4,017,133, Cl. 312-293.000.
Sigri Elektrographit GmbH: *See—*
Michels, Martin; and Settele, Wilhelm, 4,017,673.
Simmons, David Harry; and Launderville, Paul Calvin, to Litton Systems, Inc. DC to DC converter. 4,017,784, Cl. 321-2.000.
Simmons, John H.; and Daugherty, Donald A., to Precision Metalsmiths, Inc. Method and apparatus for feeding granulated material. 4,016,922, Cl. 164-45.000.
Simmons, Kenneth E.; and Williams, James E., to Eastman Kodak Company. Oxidation of p-xylene to terephthalaldehyde. 4,017,547, Cl. 260-599.000.
Simms Group Research & Development Limited: *See—*
Jarrett, Boaz Antony; and Scilly, Alec Harry, 4,017,754.
Simon, Donald J.: *See—*
Harmon, Larry R.; and Simon, Donald J., 4,017,702.
Simonneau, Robert: *See—*
Lenglin, Thierry; Lissillour, Albert; Desaunay, Jean-Louis; Le Corvec, Robert; Simonneau, Robert; and Rouquaud, Richard, 4,017,134.
Simons, Harold M.: *See—*
MacKay, Donald B.; Nielson, Brian C.; Henriksen, Dale L.; Billings, Roger Evan; Simons, Harold M.; and Hindmarsh, Paul P., 4,016,836.
Simpson, Clark C.: *See—*
Pease, Bobbylee; and Simpson, Clark C., 4,017,110.
Simpson, Peter Joseph, to Acres Consulting Services Limited. Longwall trench mining system. 4,017,122, Cl. 299-11.000.
Sinclair, Harold King: *See—*
Hammer, Clarence Frederick; and Sinclair, Harold King, 4,017,557.
Singer Company, The: *See—*
Minalga, Philip Francis, 4,016,821.
Singer, Leonard Sidney: *See—*
Lewis, Irwin Charles; McHenry, Edgar Ronald; and Singer, Leonard Sidney, 4,017,327.
Sinn, Gustav; and Matner, Martin, to Bayer Aktiengesellschaft. Pretreatment of non-wovens. 4,017,651, Cl. 427-55.000.
Sitter, Spencer B. Bracelet domer. 4,016,741, Cl. 72-415.000.
Sivaramakrishnan, Parameswar: *See—*
Baron, Arthur L.; and Sivaramakrishnan, Parameswar, 4,017,457.
Skau, Evald L., to United States of America, Agriculture. Centrifugal filtration tube for removal of the mother liquor from the crystals in the purification of a chemical compound by recrystallization. 4,017,396, Cl. 210-232.000.
Skinner, David B.: *See—*
Ferment, George R.; and Skinner, David B., 4,017,493.
Skutecki, Edmund R.; and Griffith, Carl D., to Sperry Rand Corporation. Four quadrant rate taker and synchronizer. 4,017,726, Cl. 235-186.000.
Slegers, Maurice; and Muchow, John D., to Willis Oil Tool Co. Device and method for launching and/or retrieving pipeline scrapers. 4,016,621, Cl. 15-104.06A.
Small, Charles T.: *See—*
Farnbach, William A.; and Small, Charles T., 4,017,740.
Small, Hamish; and Stevens, Timothy S., to Dow Chemical Company, The. Chromatographic apparatus for analysis of ionic species. 4,017,262, Cl. 23-253.00R.
Smeulers, Wouter; and Amsen, Willem Hendrik, to U.S. Philips Corporation. Television receiver including a beam current limiting circuit. 4,017,681, Cl. 358-171.000.
Smiley, Alan Michael, to Revlon, Inc. Adjustable wigs. 4,016,888, Cl. 132-53.000.
Smith, Carleton H.; and Dunning, Kenneth G. Battery plate grid. 4,016,633, Cl. 29-2.000.
Smith, Harry: *See—*
Cantello, Barry Christian Charles; Buckle, Derek Richard; and Smith, Harry, 4,017,639.
Smith, Hubert Stacy, to Dow Chemical Company, The. Insulation of vessels having curved surfaces. 4,017,346, Cl. 156-185.000.
Smith, Jack R.; and Burrows, Leonard H., to Westinghouse Electric Corporation. Matching response of a blade path temperature limit signal to characteristics of a gas turbine. 4,016,717, Cl. 60-39.28R.
Smith, James D. B.; and Phillips, David C., to Westinghouse Electric Corporation. Monitoring electrical apparatus against overheating by the use of coating compositions containing thermoparticulatable diazonium salts. 4,016,745, Cl. 73-19.000.
Smith, John R.; and Thompson, Ronald J., to Federal-Mogul Corporation. Sleeve type flanged bearing. 4,017,127, Cl. 308-23.000.
Smith, Lawrence Sidney, to United Technologies Corporation. Lead-lag compensated temperature sensor. 4,017,027, Cl. 236-99.00E.
Smith, Leonard G. Packing gland leak retriever device. 4,017,214, Cl. 417-9.000.
Smith, Norman E.: *See—*
Martin, Frank E.; Colston, John R.; and Smith, Norman E., 4,016,876.
SmithKline Corporation: *See—*
Bowie, Betty Anne; and Pagano, Joseph F., 4,017,420.
Willis, Chester Rhodes, 4,017,633.
Snam Progetti, S.p.A.: *See—*
Cesca, Sebastiano; Priola, Aldo; and Ferraris, Giuseppe, 4,017,553.
Snelgrove, James A.: *See—*
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Societa Internazionale per lo Sfruttamento di Brevetti S.A.: *See*—
Hanning, Robert, 4,017,225.

Societa' Italiana Materiali Pressati Resinati e Simili - S.I.M.P.R.E.S. S.r.l.: *See*—
Ferrarin, Francesco, 4,017,802.

Societa' Italiana Resine S.I.R.. S.p.A.: *See*—
Messina, Giuseppe; Olah, George Andrew; and Moraglia, Riccardo, 4,017,584.
Vargiu, Silvio; Crespolini, Giancarlo; and Grazzini, Giulio, 4,017,523.

Societe d'Assistance Technique pour Produits Nestle S.A.: *See*—
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Societe d'Etudes de Machines Thermiques: *See*—
Rouam, Jean Simon Rene, 4,016,851.

Societe Lab: *See*—
Vicard, Jean-Francois, 4,017,390.

Societe S A B: *See*—
Menard, Pierre R.; and Ledoux, Andre, 4,016,959.

Socotel Societe Mixte pour le Developpement de la Technique de la Commutation dans le Domaine des Telecommunications: *See*—
Lenglin, Thierry; Lissillour, Albert; Desaunay, Jean-Louis; Le Corvec, Robert; Simonneau, Robert; and Rouquaud, Richard, 4,017,134.

Soderstrom, Melvin Andrew: *See*—
Reavis, Robert Philmore, Jr.; and Soderstrom, Melvin Andrew, 4,017,140.

Sohda, Takashi: *See*—
Kuwada, Yutaka; Meguro, Kanji; Tawada, Hiroyuki; Sohda, Takashi; Natsugari, Hideaki; and Sato, Yoshiaki, 4,017,620.

Solari & C. Udine S.p.A.: *See*—
Felice, Fortunato, 4,017,851.

Solomon, David E.: *See*—
Budrick, Ronald G.; King, Frank T.; Martin, Alfred J.; Nolen, Robert L., Jr.; and Solomon, David E., 4,017,290.

Somani, Pitambar: *See*—
Jones, Peter Hadley; Kyncl, Jaroslav; Ours, Carroll Wayne; and Somani, Pitambar, 4,017,636.

Somerset, James Henry: *See*—
Murray, David George; and Somerset, James Henry, 4,016,606.

Sonnenberg, Fred Max: *See*—
Collette, John Wilfred; Ro, Rolland Shin-Yuan; and Sonnenberg, Fred Max, 4,017,669.

Soos, Nicholas Alec: *See*—
Jaffe, Donald; and Soos, Nicholas Alec, 4,017,495.

Sorgenfrei, Malachi E.; and Aepli, Otto T., to BASF Wyandotte Corporation. Method of washing glassware and inhibited cleaning solution and additive composition useful therein. 4,017,410, Cl. 252-156.000.

Soukup, Franz; Larsson, Tore Ingvar; and Borg, Veine Bernt, to Tetra Pak Developpement SA. Device for the forming of a packing material web in a packaging machine. 4,017,247, Cl. 425-360.000.

Soures, Nicholas M.; Patterson, James W.; and Powley, Wayne C., to Xerox Corporation. Transfer-fusing speed compensation. 4,017,067, Cl. 271-80.000.

Southwestern Engineering Company: *See*—
Yarden, Abraham L.; and Weisberg, Robert A., 4,016,835.

Southwire Company: *See*—
Hass, Wynn M., 4,017,569.

SPA-Societa Prodotti Antibiotici S.p.A.: *See*—
Ferrari, Rodolfo; and Dell'Acqua, Ernani, 4,017,603.

Spadini, Gianfranco Luigi: *See*—
Demessemaekers, Emiel Mathilde Anna Alfons; Bognolo, Guido; and Spadini, Gianfranco Luigi, 4,017,409.

Spector, George; and Casino, Sergio. Valve wrench. 4,016,783, Cl. 81-71.000.

Sperry Rand Corporation: *See*—
Baker, Kenneth L., 4,017,803.
Banys, Algis Raymond, 4,017,132.
Rogers, Bruce J., 4,017,806.
Ross, Gerald Fred, 4,017,854.
Schwartz, Bernard, 4,017,187.
Skutecki, Edmund R.; and Griffith, Carl D., 4,017,726.
Tokarchuk, E. Stephen; and Ellis, Gaylord O., 4,016,898.

Spicuzza, John P., Jr.; and Mills, Frank J. E., to ARCO Polymers, Inc. Suspension polymerization process. 4,017,670, Cl. 526-233.000.

Spin Physics, Inc.: *See*—
Bagby, John F., 4,017,899.

Sprague Electric Company: *See*—
Cheseldine, David M., 4,017,773.

Spreng, Klaus: *See*—
Lenz, Werner; Woellhaf, Josef; Spreng, Klaus; Zuerger, Manfred; Hecke, Paul; Hoffmann, Gerhard; and Obradovic, Milan, 4,017,183.

Spring, Edward F., Sr., to Chicago Pneumatic Tool Company. Pneumatic nut runner having a directional valve and an air regulator. 4,016,940, Cl. 173-169.000.

Staar, S.A.: *See*—
Staar, Theophiel Clement Jozef Lodewijk, 4,017,901.

Staar, Theophiel Clement Jozef Lodewijk, to Staar, S.A. Device for loading and unloading cartridges into and from a recording and/or playback apparatus. 4,017,901, Cl. 360-137.000.

Stach, Kurt: *See*—
Bosies, Elmar; Stach, Kurt; Schmidt, Felix Helmut; Heerdt, Ruth; and Weber, Helmut, 4,017,539.

Stadler, Klaus: *See*—
Helmberger, Josef; and Stadler, Klaus, 4,017,891.

Staebler, David Lloyd, to RCA Corporation. Recording assembly for volume holography. 4,017,144, Cl. 350-3.500.

Standard Oil Company (Indiana): *See*—
Broding, Robert A., 4,017,833.
Petrille, Dennis G., 4,017,548.

Standard Oil Company (Ohio), The: *See*—
White, James F.; and Rege, James R., 4,017,423.

Stanford Research Institute: *See*—
Green, Philip S., 4,016,750.

Stanley, Robert K., to Textured Yarn Co., Inc. Strand treatment. 4,016,632, Cl. 28-72.110.

Stapley, Edward O.; and Mata, Justo M., to Merck & Co., Inc. 7β-(D-5-amino-5-carboxyvaleramido)-7-methoxy-3-substituted-3-cephem-4-carboxylic acid antibiotics. 4,017,487, Cl. 260-243.00C.

Stauff, Joachim; Jaeschke, Wolfgang; and Schlogl, Gunter, to Stauff, Joachim. Method of measuring sulphur dioxide. 4,017,260, Cl. 23-232.00E.

Stauffer Chemical Company: *See*—
Baker, Don R., 4,017,610.
Lam, Hsiao-Ling; and Pallos, Ferenc M., 4,017,634.
Weil, Edward D., 4,017,257.

Stecker, Alvin, Sr. Vehicle step. 4,017,093, Cl. 280-163.000.

Steele, Roger B.; and Katzakian, Arthur, Jr., to Aerojet-General Corporation. Preparation of 2-hydroxyalkyl esters. 4,017,429, Cl. 260-2.0EP.

Steinmetz, Michael J.: *See*—
Criscimagna, Tony Nick; and Steinmetz, Michael J., 4,017,762.

Stelter, Ronald B., to Continental Group, Inc., The. Method and apparatus for orienting can ends. 4,016,968, Cl. 198-394.000.

Stendel, Wilhelm: *See*—
Lorenz, Walter; Hammann, Ingeborg; and Stendel, Wilhelm, 4,017,609.

Stepp, Elvin Duane; and Talley, James Reggie, to Texas Instruments Incorporated. Programmable shunt voltage regulator circuit. 4,017,788, Cl. 323-8.000.

Sterling Drug Inc.: *See*—
Doyle, Ross L.; and Harrison, Thomas S., 4,017,002.

Sternat, Hugo, to Siemens Aktiengesellschaft. Method and circuit arrangement for testing data processors. 4,017,829, Cl. 340-146.10C.

Sternbach, Leo Henryk: *See*—
Derieg, Michael Edward; Earley, James Valentine; Fryer, Rodney Ian; and Sternbach, Leo Henryk, 4,017,531.
Derieg, Michael Edward; Earley, James Valentine; Fryer, Rodney Ian; and Sternbach, Leo Henryk, 4,017,532.

Stevens, Richard H.: *See*—
Mashburn, Douglas N.; Stevens, Richard H.; and Woodall, Harold C., 4,016,768.

Stevens, Robert C.: *See*—
Daly, Lewis J.; and Brownlie, Alan W., 4,017,069.

Stevens, Timothy S.: *See*—
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Stewart, Michael H.: *See*—
Hoer, Ralph A.; and Stewart, Michael H., 4,017,646.

Stewart, William Edgar; and de Somer, Pierre Marie Hendrik Frans. Reactivation of interferon. 4,017,600, Cl. 424-85.000.

Stichting Internationaal Instituut voor Lucktkaartering en Aarkunde (ITC): *See*—
Jerie, Hans Georg, 4,017,145.

Stick, Philip P.: *See*—
Willenbecher, James F.; Stick, Philip P.; and Tedeschi, Rinaldo R., 4,016,753.

Stickley, Edward S.: *See*—
Griffith, Edwin; and Stickley, Edward S., 4,017,034.

Stoakes, Richard Lewis. Structural assemblies. 4,016,695, Cl. 52-476.000.

Stolin, Billy L.: *See*—
Brown, Ronald D.; and Stolin, Billy L., 4,017,707.

Stolting, Klaus: *See*—
Schminke, Wolfgang; Stolting, Klaus; Macholdt, Hans; and Kunkler, Hans, 4,017,671.

Stolzer, Paul, to Stopa Stahlbau GmbH & Co. Storage system. 4,016,987, Cl. 214-16.40A.

Stone, W. James: *See*—
Dillinger, Robert B.; and Stone, W. James, 4,017,040.

Stookey, Stanley D.: *See*—
Pierson, Joseph E.; and Stookey, Stanley D., 4,017,318.

Stopa Stahlbau GmbH & Co.: *See*—
Stolzer, Paul, 4,016,987.

Stopinc Aktiengesellschaft: *See*—
Meier, Ernst, 4,017,010.

Storni, Angelo: *See*—
Wilhelm, Max; Bernasconi, Raymond; Storni, Angelo; Beck, Dieter; and Schenker, Karl, 4,017,542.

Strabala, Joseph L.: *See*—
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Strasser, Bernd: *See*—
Mose, Luciano; Kramer, Wolfgang; Strewe, Wolfgang; and Strasser, Bernd, 4,017,376.

Strasser, Jurgen H.: *See*—
Wilson, Donald C.; Mencacci, Samuel A.; and Strasser, Jurgen H., 4,016,705.

Strassle, Marcel, to Syma Intercontinental S.A. Elastically-deformed adjustable T-joint. 4,017,199, Cl. 403-264.000.

Strategic Medical Research Corporation: *See*—
Gordon, Paul, 4,017,608.

Stratman, Urban Frederick, to United States of America, Army. Biaxial leaf sight. 4,016,652, Cl. 33-254.000.
Straub, Otto-Christian, to Bayer Aktiengesellschaft. Production of non-antigenic attenuated viruses. 4,017,359, Cl. 195-1.300.
Strewe, Wolfgang: *See—*
Mose, Luciano; Kramer, Wolfgang; Strewe, Wolfgang; and Strasser, Bernd, 4,017,376.
Stromberg-Carlson Corporation: *See—*
Altenburger, Otto, 4,017,691.
Richards, Glenn L.; and Pommerening, Uwe A., 4,017,689.
Structural Concepts Corporation: *See—*
Hanson, Jerry D., 4,017,130.
Strybel, Richard V., to Imperial-Eastman Corporation. Adjustable valve core depressor. 4,017,057, Cl. 251-149.100.
Stubbs, Christopher Edward; Nooi, Jacobus Roelof; and Kemper, Hermanus Christoffel, to Lever Brothers Company. Organic builder. 4,017,541, Cl. 260-535.00P.
Studiengesellschaft Kohle m.b.H.: *See—*
Wilke, Gunther; and Muller, Ernst Willi, 4,017,526.
Stumpfi, Werner: *See—*
Koester, Eberhard; Wunsch, Gerd; Deigner, Paul; Stumpfi, Werner; and Schneehage, Hans Henning, 4,017,303.
Stumpp & Schule KG: *See—*
Zwirner, Eckhard, 4,017,062.
Sturm, Elmar, to Ciba-Geigy Corporation. 7,8-Disubstituted-5-acetylquinolines and antimicrobial compositions containing them. 4,017,627, Cl. 424-258.000.
Stuttmann, Jurgen, to Hazemag Dr. E. Andreas KG. Impact crusher with adjustable impact or grinding means. 4,017,035, Cl. 241-189.00R.
Suarez, Tulio; and Jones, C. David, to Eli Lilly and Company. Novel antifertility agents. 4,017,546, Cl. 260-591.000.
Sublistatic Holding S.A.: *See—*
Beguin, Rene; and Monti, Roland, 4,017,176.
Subramanian, Gopal; and McAfee, John Gilmour, to Research Corporation. Bone-seeking indium-113m or indium-111 organic phosphonate complexes. 4,017,595, Cl. 424-1.000.
Subsea Equipment Associates Limited: *See—*
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Subtil, Andre: *See—*
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Sugimoto, Tadahiro, to Daitoseiki Co. Ltd. Method for controlling the cutting feed speed of a saw frame of band-sawing machine or similar machine. 4,016,787, Cl. 83-13.000.
Sugimura, Yukio: *See—*
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Sumitomo Chemical Company, Limited: *See—*
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Sutcliffe, Grenville G.: *See—*
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Suzuki, Hideo: *See—*
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Suzuki, Yukio: *See—*
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Svoboda, Vlastimil; and Celchovska, Olga, to Lachema, narodni podnik. Biological diagnostic test strip and method of producing same. 4,017,261, Cl. 23-253.0TP.
Swanson, Carl I.: *See—*
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Swanson, S. Keith, to Measurex Corporation. Control system for textile tenter frame. 4,017,722, Cl. 235-151.100.
Swensen, Donald E. Apparatus for aligning pipes. 4,016,637, Cl. 29-281.400.
Swiss Aluminium Ltd.: *See—*
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Szikla, Leslie. Jewelry imprinting device. 4,016,810, Cl. 101-4.000.
Szporny, Laszlo: *See—*
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Takahashi, Ryohei; Yokomichi, Isao; Maeda, Kazuyuki; and Haga, Takahiro, to Ishihara Sangyo Kaisha Ltd. Herbicidal composition. 4,017,295, Cl. 71-66.000.
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Takechi, Hiroshi: *See—*
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shi; Natsugari, Hideaki; and Sato, Yoshiaki, 4,017,620.
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Takemoto, Shigeji. Reversing cassette tape machine. 4,017,896, Cl. 360-74.000.
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Talley, James Reggie: *See—*
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Tallonneau, Georges, to S.T. Dupont. Method for the storage of a liquefied gas in the presence of an adsorbant support having open cells. 4,017,252, Cl. 431-12.000.
Tamagawa Seiki Kabushiki Kaisha: *See—*
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Tannas, Lawrence E., Jr., to Rockwell International Corporation. Transparent keyboard switch and array. 4,017,848, Cl. 340-365.00R.
Tausanovitch, Dusan: *See—*
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Tax, Hans. Package for transporting units of a modular crane. 4,016,974, Cl. 206-321.000.
Tax, Hans; and Bauer, Dieter, to Tax, Hans. Load clamping apparatus. 4,016,993, Cl. 214-394.000.
Taylor, Arthur T.: *See—*
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Taylor, David W. Ferromagnetic memory layer, methods of making and adhering it to substrates, magnetic tapes, and other products. 4,017,265, Cl. 428-675.000.
Taylor, Julian S. Thermal gauge probe. 4,016,758, Cl. 73-204.000.
Taylor, Mark W.: *See—*
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Taylor, Max F. Solar heating system. 4,016,861, Cl. 126-270.000.
Taylor, Robert A.: *See—*
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Taylor, Thomas D., to Graham-White Manufacturing Co. Differential flowmeter. 4,016,760, Cl. 73-205.00R.
Taylor, William H., to Kollmorgen Corporation. Tri-power periscope head assembly. 4,017,148, Cl. 350-37.000.
Tazuma, James J.; and Zadra, Mario D., to Goodyear Tire & Rubber Company, The. Soap solution of maleic anhydride-modified resin backbone. 4,017,441, Cl. 260-29.6PM.
Tazuma, James J.; and Zadra, Mario D., to Goodyear Tire & Rubber Company, The. Aqueous emulsion latex derived rubbery copolymer. 4,017,560, Cl. 260-888.000.
TDK Electronics Company, Limited: *See—*
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Thacker, Stephen Ernest William, to Scovill Manufacturing Company. Clamp in valves. 4,016,918, Cl. 152-427.000.
Tharp, Nelson B.; Henry, John W.; and Leydorf, George F., to United States of America, Navy. Hardened electromagnetic wave energy sensor. 4,017,863, Cl. 343-719.000.
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Thiokol Corporation: *See—*
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Thoelen, Walter P., Sr. Swimming pool cleaning apparatus. 4,017,331, Cl. 134-167.00R.
Thomas, James Ernest, to Pricemaster Ltd. Labelling machine. 4,017,350, Cl. 156-384.000.
Thomas, Paul M., to Builders Equipment Co. Closure system. 4,016,986, Cl. 214-16.40A.
Thompson, Charles. Shoe construction. 4,016,662, Cl. 36-29.000.
Thompson, Clarence T.: *See—*
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Thuillier, Germaine; and Laforest, Jacqueline, to CERPHA. Derivatives of 3-oxo-2,3-dihydro-1,4-benzoxazine for use as analgesics and antioedematous agents. 4,017,618, Cl. 424-248.54.
Thuillier born Nachmias, Germaine; Laforest born Boutillier du Retail, Jacqueline Suzanne; Cariou, Bernard Jean Marie; Bessin, Pierre Alfred Rene; Bonnet born Roux, Jacqueline Suzanne; and Thuillier, Jean Eugene, to Centre European de Recherches Pharmacologiques C.E.R.P.H.A. Phenoxyacetic acid derivatives. 4,017,632, Cl. 424-275.000.
Thuillier, Jean Eugene: *See—*
Thuillier born Nachmias, Germaine; Laforest born Boutillier du Retail, Jacqueline Suzanne; Cariou, Bernard Jean Marie; Bessin, Pierre Alfred Rene; Bonnet born Roux, Jacqueline Suzanne; and Thuillier, Jean Eugene, 4,017,632.
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Thyvold, Olav. Rudder post tube assembly. 4,016,824, Cl. 114-165.000.
Tibbitts, Allen Ben. Western-type boot pac with insulated waterproof construction. 4,016,661, Cl. 36-4.000.
Tieden, Jansey D.; and Woodruff, Forester E., Jr., to Boeing Company, The. N/C machine paging, status and report system. 4,017,831, Cl. 340-147.00P.
Tiffin, Joseph B.; Quinn, Daniel G.; and Vroonland, Evart J., to FMC Corporation. Extensible crane boom structure. 4,016,688, Cl. 52-118.000.
Tihanyi, Jenoe: *See—*
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Tobias, Martin B. Electrical circuit means for use in analogue display and/or control systems. 4,017,796, Cl. 324-122.000.
Todd, Leonard M. Telephone line voltage actuated switches. 4,017,686, Cl. 179-2.00R.
Tojo, Takayuki, to Victor Company of Japan, Limited. Radio frequency converter. 4,017,682, Cl. 358-167.000.
Tokarchuk, E. Stephen; and Ellis, Gaylord O., to Sperry Rand Corporation. Means for suppressing cavitation in a high pressure relief valve. 4,016,898, Cl. 137-115.000.
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Tomono, Masami; Abe, Akira; Harada, Seiki; Sato, Kikuji; Takagi, Takeshi; Kamoshita, Genichi; Oya, Yuichiro; and Saiki, Atsushi, to Hitachi, Ltd. Discrete semiconductor device having polymer resin as insulator and method for making the same. 4,017,886, Cl. 357-54.000.
Toombs, Harold G.; and Sullivan, Royce R., to Redlake Corporation. Method and apparatus for recording and reproducing video signals. 4,017,898, Cl. 360-105.000.
Topfl, Werner: *See—*
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Townsend, Robert E. Boring tool with variable extension. 4,017,202, Cl. 408-226.000.
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Tra, Josef, to J. M. Voith GmbH. Apparatus and method for reclaiming waste papers. 4,017,033, Cl. 241-28.000.
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Treffner, Charles; and Treffner, Peter. Roll slitter. 4,016,785, Cl. 82-53.000.
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Tsujimoto, Michihiro; Tsukahara, Ryoichi; Torisu, Masaaki; and Okubo, Ichiro, to Mitsui Toatsu Chemicals, Incorporated. Process for producing substituted or unsubstituted 2-phenyl-1.2.3.-triazole-4-carboxaldehyde. 4,017,509, Cl. 260-308.00A.
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Tsukokura, Akira: *See—*
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Turck, Ulrich; and Tetzner, Heinz, to Chemische Werke Huls Aktiengesellschaft. Coating compositions containing as binder aqueous polymer dispersions. 4,017,443, Cl. 260-29.6QT.
Turecek, Kvetoslav, to Danfoss A/S. Thermostatic control unit for radiator valves. 4,016,804, Cl. 92-34.000.
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B 48,560	4,002,772	Mar. 30, 1976	Jan. 11, 1977
B 54,859	4,000,101	Feb. 17, 1976	Dec. 28, 1976
B 59,512	3,999,216	Mar. 16, 1976	Dec. 21, 1976
B 66,272	4,014,978	Feb. 24, 1976	Mar. 29, 1977
B 71,613	4,008,393	Mar. 16, 1976	Feb. 15, 1977
B 73,017	4,001,879	Mar. 9, 1976	Jan. 4, 1977
B 78,315	3,982,192	Feb. 10, 1976	Sep. 21, 1976
B 79,099	3,982,177	Jan. 13, 1976	Sep. 21, 1976
B 97,259	3,999,614	Mar. 9, 1976	Dec. 28, 1976
B 105,006	4,007,074	Mar. 23, 1976	Feb. 8, 1977
B 111,130	4,001,380	Mar. 16, 1976	Jan. 4, 1977
B 141,968	4,013,442	Mar. 30, 1976	Mar. 22, 1977
B 150,142	3,981,767	Jan. 27, 1976	Sep. 21, 1976
B 160,045	3,983,446	Jan. 13, 1976	Sep. 28, 1976
B 160,099	3,987,221	Jan. 13, 1976	Oct. 19, 1976
B 163,463	3,981,659	Jan. 27, 1976	Sep. 21, 1976
B 167,470	4,001,101	Mar. 2, 1976	Jan. 4, 1977
B 181,208	4,001,391	Mar. 9, 1976	Jan. 4, 1977
B 200,759	3,986,872	Feb. 3, 1976	Oct. 19, 1976
B 208,916	3,987,106	Jan. 13, 1976	Oct. 19, 1976
B 214,925	3,997,648	Mar. 9, 1976	Dec. 14, 1976
B 223,678	3,989,159	Mar. 9, 1976	Nov. 2, 1976
B 231,416	4,000,054	Mar. 30, 1976	Dec. 28, 1976
B 236,266	4,013,624	Mar. 23, 1976	Mar. 22, 1977
B 236,342	4,001,182	Feb. 10, 1976	Jan. 4, 1977
B 248,240	3,983,556	Jan. 13, 1976	Sep. 28, 1976
B 257,143	4,000,111	Mar. 16, 1976	Dec. 28, 1976
B 270,274	3,982,223	Feb. 17, 1976	Sep. 21, 1976
B 270,351	3,997,893	Mar. 30, 1976	Dec. 14, 1976
B 271,743	4,001,195	Mar. 16, 1976	Jan. 4, 1977
B 276,026	3,992,405	Feb. 3, 1976	Nov. 16, 1976
B 279,415	4,000,697	Mar. 16, 1976	Jan. 4, 1977
B 279,969	3,986,073	Jan. 13, 1976	Oct. 12, 1976
B 281,162	4,009,481	Mar. 23, 1976	Feb. 22, 1977
B 283,941	3,995,313	Feb. 3, 1976	Nov. 30, 1976
B 288,757	4,001,072	Mar. 30, 1976	Jan. 4, 1977
B 301,143	3,991,107	Jan. 27, 1976	Nov. 9, 1976
B 302,160	3,985,774	Feb. 3, 1976	Oct. 12, 1976
B 306,668	3,985,713	Feb. 3, 1976	Oct. 12, 1976
B 307,698	3,993,763	Feb. 3, 1976	Nov. 23, 1976
B 308,659	3,981,947	Jan. 27, 1976	Sep. 21, 1976
B 311,450	3,988,976	Mar. 9, 1976	Nov. 2, 1976
B 311,779	4,013,481	Feb. 10, 1976	Mar. 22, 1977
B 313,280	4,003,591	Apr. 6, 1976	Jan. 18, 1977
B 326,211	3,988,272	Mar. 23, 1976	Oct. 26, 1976
B 328,065	4,014,752	Mar. 30, 1976	Mar. 29, 1977
B 328,077	4,014,860	Apr. 13, 1976	Mar. 29, 1977
B 328,116	4,000,774	Mar. 9, 1976	Jan. 4, 1977
B 330,719	4,001,121	Mar. 16, 1976	Jan. 4, 1977
B 330,736	3,996,299	Feb. 3, 1976	Dec. 7, 1976
B 332,442	4,001,231	Mar. 30, 1976	Jan. 4, 1977
B 333,110	3,989,867	Mar. 16, 1976	Nov. 2, 1976
B 333,247	4,001,201	Mar. 16, 1976	Jan. 4, 1977
B 333,838	4,006,263	Mar. 23, 1976	Feb. 1, 1977
B 335,783	4,013,744	Mar. 30, 1976	Mar. 22, 1977
B 336,754	3,989,805	Mar. 16, 1976	Nov. 2, 1976
B 337,023	4,013,188	Mar. 30, 1976	Mar. 22, 1977
B 337,823	4,002,746	Mar. 23, 1976	Jan. 11, 1977
B 339,194	3,982,215	Feb. 3, 1976	Sep. 21, 1976
B 339,446	4,001,067	Feb. 24, 1976	Jan. 4, 1977
B 340,170	4,000,444	Mar. 30, 1976	Dec. 28, 1976
B 344,669	4,013,655	Mar. 16, 1976	Mar. 22, 1977
B 347,661	3,999,218	Mar. 16, 1976	Dec. 21, 1976
B 348,433	3,984,405	Feb. 3, 1976	Oct. 5, 1976
B 349,370	3,989,684	Jan. 27, 1976	Nov. 2, 1976
B 351,455	4,001,309	Feb. 24, 1976	Jan. 4, 1977
B 354,222	4,012,305	Mar. 23, 1976	Mar. 15, 1977
B 354,959	3,995,996	Feb. 17, 1976	Dec. 7, 1976
B 356,187	3,981,222	Jan. 20, 1976	Sep. 21, 1976
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B 357,526	4,001,319	Mar. 23, 1976	Jan. 4, 1977
B 358,260	3,989,661	Mar. 30, 1976	Nov. 2, 1976
B 358,427	3,989,896	Feb. 3, 1976	Nov. 2, 1976
B 359,768	4,013,684	Mar. 30, 1976	Mar. 22, 1977
B 359,901	3,981,729	Jan. 13, 1976	Sep. 21, 1976
B 361,954	4,014,753	Apr. 6, 1976	Mar. 29, 1977
B 363,565	4,004,821	Mar. 30, 1976	Jan. 25, 1977
B 364,797	3,996,131	Feb. 17, 1976	Dec. 7, 1976
B 367,092	4,014,920	Apr. 13, 1976	Mar. 29, 1977
B 367,305	3,998,640	Mar. 2, 1976	Dec. 21, 1976
B 367,621	3,989,589	Feb. 3, 1976	Nov. 2, 1976
B 369,221	3,985,834	Feb. 24, 1976	Oct. 12, 1976
B 369,373	4,013,683	Mar. 23, 1976	Mar. 22, 1977
B 369,379	4,013,754	Mar. 30, 1976	Mar. 22, 1977
B 370,309	3,989,640	Jan. 20, 1976	Nov. 2, 1976
B 371,095	4,005,074	Mar. 23, 1976	Jan. 25, 1977
B 371,635	4,010,290	Mar. 23, 1976	Mar. 1, 1977
B 371,912	3,995,738	Mar. 2, 1976	Dec. 7, 1976
B 372,016	3,989,685	Mar. 9, 1976	Nov. 2, 1976
B 372,232	4,000,967	Mar. 16, 1976	Jan. 4, 1977
B 372,722	3,998,925	Mar. 9, 1976	Dec. 21, 1976
B 373,354	3,989,870	Jan. 27, 1976	Nov. 2, 1976
B 374,553	4,008,394	Mar. 30, 1976	Feb. 15, 1977
B 374,588	3,985,899	Jan. 27, 1976	Oct. 12, 1976
B 376,749	4,014,856	Mar. 30, 1976	Mar. 29, 1977
B 378,513	3,981,750	Jan. 27, 1976	Sep. 21, 1976
B 378,760	4,001,477	Mar. 9, 1976	Jan. 4, 1977
B 379,177	3,981,976	Jan. 27, 1976	Sep. 21, 1976
B 380,137	4,014,802	Mar. 23, 1976	Mar. 29, 1977
B 381,006	4,009,447	Apr. 6, 1976	Feb. 22, 1977
B 381,709	3,984,587	Jan. 13, 1976	Oct. 5, 1976
B 381,985	3,990,775	Feb. 3, 1976	Nov. 9, 1976
B 382,120	4,013,639	Mar. 23, 1976	Mar. 22, 1977
B 383,697	4,008,211	Feb. 17, 1976	Feb. 15, 1977
B 384,225	3,998,523	Mar. 16, 1976	Dec. 21, 1976
B 384,330	3,985,613	Jan. 27, 1976	Oct. 12, 1976
B 384,654	3,992,681	Feb. 24, 1976	Nov. 16, 1976
B 385,024	3,994,911	Feb. 10, 1976	Nov. 30, 1976
B 385,483	3,993,684	Feb. 17, 1976	Nov. 23, 1976
B 385,631	3,982,924	Jan. 27, 1976	Sep. 28, 1976
B 386,257	3,981,915	Feb. 3, 1976	Sep. 21, 1976
B 386,673	3,993,717	Feb. 3, 1976	Nov. 23, 1976
B 386,828	3,992,440	Feb. 3, 1976	Nov. 16, 1976
B 387,337	D 243,157	Mar. 16, 1976	Jan. 25, 1977
B 388,675	4,012,459	Mar. 30, 1976	Mar. 15, 1977
B 389,155	4,000,970	Mar. 30, 1976	Jan. 4, 1977
B 389,304	3,986,829	Jan. 27, 1976	Oct. 19, 1976
B 390,031	3,985,799	Jan. 13, 1976	Oct. 12, 1976
B 390,408	3,992,426	Feb. 3, 1976	Nov. 16, 1976
B 390,979	4,003,850	Mar. 23, 1976	Jan. 18, 1977
B 391,473	3,988,370	Mar. 2, 1976	Oct. 26, 1976
B 391,797	3,988,046	Mar. 9, 1976	Oct. 26, 1976
B 391,828	4,014,933	Apr. 6, 1976	Mar. 29, 1977
B 391,844	3,999,165	Mar. 16, 1976	Dec. 21, 1976
B 392,798	3,996,249	Mar. 30, 1976	Dec. 7, 1976
B 394,248	3,989,764	Jan. 27, 1976	Nov. 2, 1976
B 394,350	3,982,200	Jan. 13, 1976	Sep. 21, 1976
B 394,742	4,009,285	Apr. 13, 1976	Feb. 22, 1977
B 395,554	3,998,156	Mar. 9, 1976	Dec. 21, 1976
B 395,975	4,001,085	Mar. 2, 1976	Jan. 4, 1977
B 396,164	3,989,590	Feb. 3, 1976	Nov. 2, 1976
B 396,377	D 243,148	Apr. 6, 1976	Jan. 25, 1977
B 397,674	3,998,438	Mar. 16, 1976	Dec. 21, 1976
B 398,084	3,996,239	Feb. 3, 1976	Dec. 7, 1976
B 398,220	3,990,834	Feb. 3, 1976	Nov. 9, 1976
B 398,488	3,987,991	Feb. 24, 1976	Oct. 26, 1976
B 399,098	3,997,665	Feb. 24, 1976	Dec. 14, 1976
B 399,632	4,001,046	Mar. 9, 1976	Jan. 4, 1977
B 399,908	3,983,323	Jan. 13, 1976	Sep. 28, 1976
B 400,871	3,988,893	Feb. 17, 1976	Nov. 2, 1976
B 401,042	D 242,197	Mar. 16, 1976	Nov. 9, 1976
B 401,221	4,014,791	Apr. 6, 1976	Mar. 29, 1977
B 402,162	3,994,902	Mar. 2, 1976	Nov. 30, 1976
B 402,328	3,995,545	Apr. 6, 1976	Dec. 7, 1976
B 402,553	3,983,219	Feb. 17, 1976	Sep. 28, 1976
B 402,657	4,013,665	Apr. 6, 1976	Mar. 22, 1977
B 402,929	3,991,251	Feb. 3, 1976	Nov. 9, 1976
B 403,076	4,014,917	Apr. 20, 1976	Mar. 29, 1977
B 403,243	3,996,232	Mar. 30, 1976	Dec. 7, 1976
B 403,326	4,001,212	Mar. 23, 1976	Jan. 4, 1977
B 403,477	3,995,315	Feb. 3, 1976	Nov. 30, 1976
B 403,507	3,982,095	Feb. 10, 1976	Sep. 21, 1976
B 403,766	3,994,834	Feb. 10, 1976	Nov. 30, 1976
B 403,883	4,001,481	Mar. 23, 1976	Jan. 4, 1977
B 405,726	3,981,241	Jan. 13, 1976	Sep. 21, 1976
B 406,546	D 242,966	Mar. 16, 1976	Jan. 11, 1977
B 407,205	4,000,966	Mar. 16, 1976	Jan. 4, 1977
B 407,737	3,992,546	Feb. 3, 1976	Nov. 16, 1976
B 407,812	4,010,006	Mar. 23, 1976	Mar. 1, 1977
B 408,123	4,014,887	Apr. 13, 1976	Mar. 29, 1977
B 409,848	3,983,270	Jan. 27, 1976	Sep. 28, 1976
B 410,074	4,001,303	Feb. 24, 1976	Jan. 4, 1977
B 410,694	3,995,530	Mar. 23, 1976	Dec. 7, 1976
B 411,471	3,982,933	Feb. 17, 1976	Sep. 28, 1976
B 411,624	4,001,205	Mar. 16, 1976	Jan. 4, 1977
B 411,765	3,993,428	Feb. 24, 1976	Nov. 23, 1976
B 412,068	3,981,244	Jan. 13, 1976	Sep. 21, 1976
B 412,124	4,007,000	Mar. 23, 1976	Feb. 8, 1977
B 413,379	4,001,325	Mar. 9, 1976	Jan. 4, 1977
B 414,028	3,993,738	Feb. 17, 1976	Nov. 23, 1976
B 414,266	3,993,614	Feb. 10, 1976	Nov. 23, 1976
B 414,481	3,982,979	Jan. 20, 1976	Sep. 28, 1976
B 414,971	D 242,208	Feb. 10, 1976	Nov. 9, 1976
B 415,021	3,994,173	Mar. 2, 1976	Nov. 30, 1976

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 415,122	3,997,503	Feb. 10, 1976	Dec. 14, 1976
B 415,590	4,009,317	Mar. 23, 1976	Feb. 22, 1977
B 416,257	4,001,335	Mar. 16, 1976	Jan. 4, 1977
B 416,589	3,990,363	Jan. 27, 1976	Nov. 9, 1976
B 417,014	3,981,851	Jan. 13, 1976	Sep. 21, 1976
B 417,164	4,001,360	Mar. 2, 1976	Jan. 4, 1977
B 417,349	3,985,076	Mar. 9, 1976	Oct. 12, 1976
B 417,498	4,013,471	Mar. 23, 1976	Mar. 22, 1977
B 418,489	3,989,592	Jan. 13, 1976	Nov. 2, 1976
B 419,173	3,999,728	Mar. 9, 1976	Dec. 28, 1976
B 419,582	3,989,681	Mar. 2, 1976	Nov. 2, 1976
B 420,176	4,001,017	Mar. 16, 1976	Jan. 4, 1977
B 420,321	3,990,645	Mar. 30, 1976	Nov. 9, 1976
B 420,472	3,993,934	Feb. 24, 1976	Nov. 23, 1976
B 421,373	4,001,326	Mar. 23, 1976	Jan. 4, 1977
B 421,608	4,013,806	Mar. 23, 1976	Mar. 22, 1977
B 421,975	3,994,693	Mar. 2, 1976	Nov. 30, 1976
B 422,063	3,994,835	Feb. 3, 1976	Nov. 30, 1976
B 422,156	4,010,401	Mar. 23, 1976	Mar. 1, 1977
B 423,365	3,996,186	Feb. 17, 1976	Dec. 7, 1976
B 423,404	3,990,958	Mar. 2, 1976	Nov. 9, 1976
B 423,441	3,997,137	Feb. 17, 1976	Dec. 14, 1976
B 423,867	3,990,844	Feb. 3, 1976	Nov. 9, 1976
B 423,883	3,986,871	Jan. 27, 1976	Oct. 19, 1976
B 424,354	D 242,416	Feb. 10, 1976	Nov. 23, 1976
B 424,989	3,990,569	Feb. 3, 1976	Nov. 9, 1976
B 425,193	4,002,107	Mar. 23, 1976	Jan. 11, 1977
B 425,285	4,014,676	Apr. 13, 1976	Mar. 29, 1977
B 425,462	3,998,396	Mar. 9, 1976	Dec. 21, 1976
B 425,588	3,985,111	Jan. 13, 1976	Oct. 12, 1976
B 426,157	4,013,714	Mar. 23, 1976	Mar. 22, 1977
B 426,227	3,999,028	Mar. 2, 1976	Dec. 21, 1976
B 426,266	3,998,839	Mar. 2, 1976	Dec. 21, 1976
B 426,274	4,014,949	Jan. 20, 1976	Mar. 29, 1977
B 426,424	3,993,742	Feb. 3, 1976	Nov. 23, 1976
B 426,639	3,992,539	Feb. 3, 1976	Nov. 16, 1976
B 426,819	3,995,868	Feb. 17, 1976	Dec. 7, 1976
B 427,883	3,982,277	Jan. 20, 1976	Sep. 21, 1976
B 427,946	4,006,161	Mar. 23, 1976	Feb. 1, 1977
B 428,103	4,000,211	Feb. 10, 1976	Dec. 28, 1976
B 428,271	3,987,415	Mar. 23, 1976	Oct. 19, 1976
B 428,408	3,995,252	Mar. 2, 1976	Nov. 30, 1976
B 428,877	3,984,649	Jan. 27, 1976	Oct. 5, 1976
B 429,018	3,990,061	Feb. 10, 1976	Nov. 2, 1976
B 429,027	4,001,260	Mar. 23, 1976	Jan. 4, 1977
B 429,157	3,990,628	Jan. 27, 1976	Nov. 9, 1976
B 429,434	3,989,223	Feb. 17, 1976	Nov. 2, 1976
B 430,157	3,992,465	Feb. 17, 1976	Nov. 16, 1976
B 430,172	3,982,563	Jan. 13, 1976	Sep. 28, 1976
B 430,213	4,013,514	Mar. 30, 1976	Mar. 22, 1977
B 430,276	3,982,171	Jan. 20, 1976	Sep. 21, 1976
B 430,287	D 242,489	Feb. 10, 1976	Nov. 23, 1976
B 430,326	4,003,581	Mar. 23, 1976	Jan. 18, 1977
B 430,334	3,981,677	Jan. 27, 1976	Sep. 21, 1976
B 431,072	3,985,610	Jan. 20, 1976	Oct. 12, 1976
B 431,334	3,988,095	Mar. 16, 1976	Oct. 26, 1976
B 431,713	4,000,167	Feb. 10, 1976	Dec. 28, 1976
B 431,785	3,999,950	Feb. 24, 1976	Dec. 28, 1976
B 431,797	4,007,290	Mar. 30, 1976	Feb. 8, 1977
B 432,049	3,995,123	Mar. 23, 1976	Nov. 30, 1976
B 432,140	3,999,163	Mar. 23, 1976	Dec. 21, 1976
B 432,265	4,013,480	Mar. 23, 1976	Mar. 22, 1977
B 432,594	4,003,404	Mar. 30, 1976	Jan. 18, 1977
B 432,969	3,997,017	Mar. 2, 1976	Dec. 14, 1976
B 432,991	3,991,669	Mar. 2, 1976	Nov. 16, 1976
B 433,094	3,987,768	Jan. 27, 1976	Oct. 26, 1976
B 433,707	4,013,594	Mar. 23, 1976	Mar. 22, 1977
B 433,892	4,016,061	Apr. 6, 1976	Apr. 5, 1977
B 433,930	4,012,324	Mar. 23, 1976	Mar. 15, 1977
B 434,206	3,994,610	Feb. 3, 1976	Nov. 30, 1976
B 434,441	D 242,849	Mar. 16, 1976	Dec. 28, 1976
B 435,481	4,000,892	Mar. 9, 1976	Jan. 4, 1977
B 435,570	4,000,908	Mar. 16, 1976	Jan. 4, 1977
B 435,617	4,001,234	Mar. 16, 1976	Jan. 4, 1977
B 436,724	3,991,856	Feb. 24, 1976	Nov. 16, 1976
B 437,209	4,001,193	Feb. 3, 1976	Jan. 4, 1977
B 437,559	3,993,287	Feb. 3, 1976	Nov. 23, 1976
B 437,596	3,985,638	Jan. 27, 1976	Oct. 12, 1976
B 437,894	4,001,015	Mar. 2, 1976	Jan. 4, 1977
B 437,986	4,011,399	Apr. 20, 1976	Mar. 8, 1977
B 438,048	4,001,394	Mar. 23, 1976	Jan. 4, 1977
B 438,484	3,992,451	Feb. 17, 1976	Nov. 16, 1976
B 438,882	3,983,719	Feb. 24, 1976	Oct. 5, 1976
B 438,916	3,983,050	Jan. 13, 1976	Sep. 28, 1976
B 439,542	3,982,199	Jan. 27, 1976	Sep. 21, 1976
B 439,778	4,001,455	Feb. 3, 1976	Jan. 4, 1977
B 440,548	4,001,271	Mar. 16, 1976	Jan. 4, 1977
B 440,632	4,014,955	Apr. 13, 1976	Mar. 29, 1977
B 440,633	4,000,116	Feb. 10, 1976	Dec. 28, 1976
B 440,858	3,993,670	Feb. 3, 1976	Nov. 23, 1976
B 441,543	4,014,755	Mar. 23, 1976	Mar. 29, 1977
B 441,723	3,988,249	Mar. 16, 1976	Oct. 26, 1976
B 441,789	4,001,449	Mar. 30, 1976	Jan. 4, 1977
B 442,163	D 242,192	Mar. 16, 1976	Nov. 9, 1976
B 442,295	4,000,477	Mar. 16, 1976	Dec. 28, 1976
B 442,431	4,011,260	Mar. 23, 1976	Mar. 8, 1977
B 442,810	3,997,533	Feb. 24, 1976	Dec. 14, 1976
B 442,866	3,982,351	Feb. 24, 1976	Sep. 28, 1976
B 442,953	4,002,657	Mar. 23, 1976	Jan. 11, 1977
B 442,970	3,989,890	Feb. 3, 1976	Nov. 2, 1976
B 443,163	3,981,242	Feb. 3, 1976	Sep. 21, 1976
B 443,446	D 242,494	Apr. 6, 1976	Nov. 23, 1976
B 443,563	3,996,204	Feb. 24, 1976	Dec. 7, 1976
B 443,647	3,990,737	Feb. 17, 1976	Nov. 9, 1976
B 443,712	3,982,233	Jan. 27, 1976	Sep. 21, 1976
B 444,078	4,014,854	Mar. 23, 1976	Mar. 29, 1977
B 444,294	4,013,634	Mar. 30, 1976	Mar. 22, 1977
B 444,437	3,995,171	Mar. 9, 1976	Nov. 30, 1976
B 445,166	4,001,252	Mar. 2, 1976	Jan. 4, 1977
B 445,459	3,988,889	Feb. 3, 1976	Nov. 2, 1976
B 445,493	3,994,903	Mar. 2, 1976	Nov. 30, 1976
B 445,690	3,999,584	Feb. 3, 1976	Dec. 28, 1976
B 446,107	4,001,276	Mar. 9, 1976	Jan. 4, 1977
B 446,956	4,014,765	Apr. 13, 1976	Mar. 29, 1977
B 447,000	3,984,419	Feb. 3, 1976	Oct. 5, 1976
B 447,440	3,991,724	Feb. 17, 1976	Nov. 16, 1976
B 449,892	3,997,919	Mar. 23, 1976	Dec. 14, 1976
B 449,988	4,014,794	Mar. 30, 1976	Mar. 29, 1977
B 450,196	3,997,701	Feb. 10, 1976	Dec. 14, 1976
B 450,413	4,007,463	Mar. 23, 1976	Feb. 8, 1977
B 450,521	3,982,838	Feb. 17, 1976	Sep. 28, 1976
B 450,701	3,991,084	Mar. 16, 1976	Nov. 9, 1976
B 450,708	3,989,724	Mar. 9, 1976	Nov. 2, 1976
B 450,870	3,998,951	Mar. 16, 1976	Dec. 21, 1976
B 450,967	3,983,055	Jan. 13, 1976	Sep. 28, 1976
B 451,248	3,997,758	Mar. 2, 1976	Dec. 14, 1976
B 451,308	3,991,037	Feb. 17, 1976	Nov. 9, 1976
B 451,396	4,000,450	Apr. 13, 1976	Dec. 28, 1976
B 451,438	Re. 29,066	Mar. 2, 1976	Dec. 7, 1976
B 451,534	3,986,033	Jan. 13, 1976	Oct. 12, 1976
B 452,034	4,002,367	Mar. 23, 1976	Jan. 11, 1977
B 452,138	4,004,278	Mar. 23, 1976	Jan. 18, 1977
B 452,293	4,014,726	Mar. 30, 1976	Mar. 29, 1977
B 452,501	4,001,111	Mar. 16, 1976	Jan. 4, 1977
B 452,672	3,981,602	Jan. 13, 1976	Sep. 21, 1976
B 452,879	4,001,089	Mar. 16, 1976	Jan. 4, 1977
B 452,883	3,981,735	Jan. 27, 1976	Sep. 21, 1976
B 452,915	4,013,933	Mar. 30, 1976	Mar. 22, 1977
B 452,938	3,994,719	Feb. 17, 1976	Nov. 30, 1976
B 452,944	4,009,773	Mar. 30, 1976	Mar. 1, 1977
B 453,031	3,998,678	Mar. 16, 1976	Dec. 21, 1976
B 453,067	4,005,394	Mar. 23, 1976	Jan. 25, 1977
B 453,238	3,997,063	Mar. 2, 1976	Dec. 14, 1976
B 453,432	4,000,514	Mar. 16, 1976	Dec. 28, 1976
B 453,533	3,997,744	Feb. 17, 1976	Dec. 14, 1976
B 453,616	3,987,376	Jan. 27, 1976	Oct. 19, 1976
B 453,759	3,989,790	Jan. 27, 1976	Nov. 2, 1976
B 453,960	4,014,701	Apr. 13, 1976	Mar. 29, 1977
B 454,283	3,995,153	Feb. 3, 1976	Nov. 30, 1976
B 454,833	4,008,733	Mar. 30, 1976	Feb. 22, 1977
B 455,425	3,990,060	Feb. 3, 1976	Nov. 2, 1976
B 455,481	3,991,092	Feb. 24, 1976	Nov. 9, 1976
B 455,486	4,001,353	Mar. 16, 1976	Jan. 4, 1977
B 455,686	4,001,156	Mar. 2, 1976	Jan. 4, 1977
B 455,759	3,984,242	Feb. 24, 1976	Oct. 5, 1976
B 455,806	3,998,919	Mar. 23, 1976	Dec. 21, 1976
B 456,069	3,998,991	Mar. 9, 1976	Dec. 21, 1976
B 456,148	3,984,269	Jan. 13, 1976	Oct. 5, 1976
B 456,153	3,997,992	Mar. 9, 1976	Dec. 21, 1976
B 456,384	4,014,859	Apr. 6, 1976	Mar. 29, 1977
B 456,579	3,993,715	Feb. 10, 1976	Nov. 23, 1976
B 456,869	4,001,277	Mar. 9, 1976	Jan. 4, 1977
B 456,900	3,996,262	Feb. 3, 1976	Dec. 7, 1976
B 456,905	4,013,431	Mar. 23, 1976	Mar. 22, 1977
B 457,547	3,996,397	Feb. 17, 1976	Dec. 7, 1976
B 457,850	3,993,586	Feb. 10, 1976	Nov. 23, 1976
B 457,862	3,987,195	Jan. 27, 1976	Oct. 19, 1976
B 457,886	3,988,498	Jan. 13, 1976	Oct. 26, 1976
B 457,931	4,001,229	Mar. 16, 1976	Jan. 4, 1977
B 458,500	3,997,805	Feb. 24, 1976	Dec. 14, 1976
B 458,617	3,984,422	Feb. 3, 1976	Oct. 5, 1976
B 458,964	3,996,615	Mar. 2, 1976	Dec. 7, 1976
B 459,190	4,010,786	Mar. 30, 1976	Mar. 8, 1977
B 459,381	4,000,017	Mar. 9, 1976	Dec. 28, 1976

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 459,597	3,996,711	Feb. 17, 1976	Dec. 14, 1976
B 459,811	3,982,173	Jan. 20, 1976	Sep. 21, 1976
B 459,821	4,005,954	Mar. 30, 1976	Feb. 1, 1977
B 460,388	3,989,448	Jan. 27, 1976	Nov. 2, 1976
B 460,441	3,981,828	Jan. 13, 1976	Sep. 21, 1976
B 460,846	3,985,817	Feb. 24, 1976	Oct. 12, 1976
B 461,184	3,992,482	Feb. 17, 1976	Nov. 16, 1976
B 461,250	4,000,768	Mar. 16, 1976	Jan. 4, 1977
B 461,336	3,982,231	Feb. 3, 1976	Sep. 21, 1976
B 461,352	3,981,681	Jan. 13, 1976	Sep. 21, 1976
B 461,685	4,013,661	Mar. 30, 1976	Mar. 22, 1977
B 461,752	4,016,541	Apr. 20, 1976	Apr. 5, 1977
B 461,874	3,982,276	Jan. 27, 1976	Sep. 21, 1976
B 462,030	4,009,342	Mar. 23, 1976	Feb. 22, 1977
B 462,386	3,988,188	Jan. 13, 1976	Oct. 26, 1976
B 462,424	3,989,602	Feb. 24, 1976	Nov. 2, 1976
B 462,828	3,998,395	Mar. 9, 1976	Dec. 21, 1976
B 462,893	3,984,253	Feb. 24, 1976	Oct. 5, 1976
B 463,322	3,989,982	Jan. 20, 1976	Nov. 2, 1976
B 463,388	3,992,605	Feb. 10, 1976	Nov. 16, 1976
B 463,473	4,002,068	Mar. 23, 1976	Jan. 11, 1977
B 463,591	4,015,051	Mar. 30, 1976	Mar. 29, 1977
B 463,671	3,985,385	Jan. 13, 1976	Oct. 12, 1976
B 464,027	3,999,390	Mar. 16, 1976	Dec. 28, 1976
B 464,290	3,990,307	Feb. 3, 1976	Nov. 9, 1976
B 464,491	4,015,612	Mar. 30, 1976	Apr. 5, 1977
B 464,587	3,991,091	Feb. 3, 1976	Nov. 9, 1976
B 464,593	3,997,659	Mar. 9, 1976	Dec. 14, 1976
B 465,145	3,981,148	Jan. 27, 1976	Sep. 21, 1976
B 465,202	3,989,757	Feb. 24, 1976	Nov. 2, 1976
B 465,393	3,987,390	Jan. 27, 1976	Oct. 19, 1976
B 465,688	3,989,770	Jan. 27, 1976	Nov. 2, 1976
B 465,955	3,997,502	Feb. 3, 1976	Dec. 14, 1976
B 466,304	4,007,095	Mar. 23, 1976	Feb. 8, 1977
B 466,318	3,999,115	Mar. 9, 1976	Dec. 21, 1976
B 466,390	3,983,349	Feb. 24, 1976	Sep. 28, 1976
B 466,419	4,011,087	Mar. 23, 1976	Mar. 8, 1977
B 466,444	3,986,039	Jan. 20, 1976	Oct. 12, 1976
B 466,906	3,993,037	Mar. 16, 1976	Nov. 23, 1976
B 466,929	3,991,195	Jan. 27, 1976	Nov. 9, 1976
B 467,250	3,997,428	Feb. 3, 1976	Dec. 14, 1976
B 467,328	3,997,599	Mar. 9, 1976	Dec. 14, 1976
B 467,412	3,981,265	Jan. 13, 1976	Sep. 21, 1976
B 467,486	3,991,725	Mar. 16, 1976	Nov. 16, 1976
B 467,971	3,983,453	Jan. 13, 1976	Sep. 28, 1976
B 468,052	3,988,335	Feb. 10, 1976	Oct. 26, 1976
B 468,100	3,995,107	Mar. 9, 1976	Nov. 30, 1976
B 468,330	4,001,475	Mar. 16, 1976	Jan. 4, 1977
B 468,350	3,981,922	Jan. 13, 1976	Sep. 21, 1976
B 468,421	4,014,739	Mar. 30, 1976	Mar. 29, 1977
B 468,603	4,003,839	Mar. 23, 1976	Jan. 18, 1977
B 469,036	4,005,926	Mar. 16, 1976	Feb. 1, 1977
B 469,468	4,000,220	Mar. 16, 1976	Dec. 28, 1976
B 469,947	3,984,153	Jan. 20, 1976	Oct. 5, 1976
B 470,170	3,986,410	Jan. 13, 1976	Oct. 19, 1976
B 470,305	4,014,043	Apr. 6, 1976	Mar. 22, 1977
B 470,348	3,981,929	Jan. 13, 1976	Sep. 21, 1976
B 470,576	3,997,507	Feb. 24, 1976	Dec. 14, 1976
B 470,601	3,985,655	Mar. 9, 1976	Oct. 12, 1976
B 470,798	3,987,480	Jan. 20, 1976	Oct. 19, 1976
B 470,853	4,002,101	Mar. 23, 1976	Jan. 11, 1977
B 470,899	3,996,441	Mar. 2, 1976	Dec. 7, 1976
B 470,900	4,001,213	Mar. 2, 1976	Jan. 4, 1977
B 470,945	4,014,848	Apr. 13, 1976	Mar. 29, 1977
B 471,116	4,001,318	Feb. 17, 1976	Jan. 4, 1977
B 471,221	3,981,974	Jan. 13, 1976	Sep. 21, 1976
B 471,405	3,993,576	Feb. 10, 1976	Nov. 23, 1976
B 471,494	3,993,660	Mar. 16, 1976	Nov. 23, 1976
B 471,579	3,985,689	Jan. 13, 1976	Oct. 12, 1976
B 471,617	3,994,871	Feb. 10, 1976	Nov. 30, 1976
B 471,681	4,012,844	Apr. 13, 1976	Mar. 22, 1977
B 471,735	3,989,408	Feb. 3, 1976	Nov. 2, 1976
B 471,836	4,000,150	Feb. 24, 1976	Dec. 28, 1976
B 472,241	3,992,453	Feb. 17, 1976	Nov. 16, 1976
B 472,256	3,985,789	Jan. 13, 1976	Oct. 12, 1976
B 472,284	3,982,078	Jan. 13, 1976	Sep. 21, 1976
B 472,591	4,013,029	Apr. 6, 1976	Mar. 22, 1977
B 472,760	4,001,330	Apr. 13, 1976	Jan. 4, 1977
B 473,039	3,985,747	Feb. 10, 1976	Oct. 12, 1976
B 473,040	3,985,738	Feb. 10, 1976	Oct. 12, 1976
B 473,813	3,989,071	Mar. 9, 1976	Nov. 2, 1976
B 473,972	3,984,043	Jan. 13, 1976	Oct. 5, 1976
B 474,573	3,988,375	Jan. 20, 1976	Oct. 26, 1976
B 474,747	3,997,704	Feb. 24, 1976	Dec. 14, 1976
B 475,236	3,989,990	Feb. 3, 1976	Nov. 2, 1976
B 475,385	4,001,071	Mar. 9, 1976	Jan. 4, 1977
B 475,681	3,983,332	Jan. 20, 1976	Sep. 28, 1976
B 476,267	4,005,068	Apr. 6, 1976	Jan. 25, 1977
B 476,372	3,985,771	Feb. 24, 1976	Oct. 12, 1976
B 476,542	4,013,549	Mar. 30, 1976	Mar. 22, 1977
B 476,568	3,999,456	Mar. 16, 1976	Dec. 28, 1976
B 476,577	3,982,070	Jan. 20, 1976	Sep. 21, 1976
B 476,681	3,986,181	Jan. 13, 1976	Oct. 12, 1976
B 476,776	3,998,715	Mar. 23, 1976	Dec. 21, 1976
B 476,967	3,995,206	Mar. 9, 1976	Nov. 30, 1976
B 477,252	3,985,759	Jan. 13, 1976	Oct. 12, 1976
B 477,481	3,991,076	Feb. 3, 1976	Nov. 9, 1976
B 477,584	D 242,855	Apr. 6, 1976	Dec. 28, 1976
B 477,597	3,993,912	Feb. 17, 1976	Nov. 23, 1976
B 477,892	4,010,355	Mar. 30, 1976	Mar. 1, 1977
B 478,234	4,010,421	Mar. 30, 1976	Mar. 1, 1977
B 478,739	3,992,253	Feb. 17, 1976	Nov. 16, 1976
B 479,175	3,985,700	Feb. 17, 1976	Oct. 12, 1976
B 479,242	3,983,074	Feb. 17, 1976	Sep. 28, 1976
B 479,502	3,999,030	Mar. 16, 1976	Dec. 21, 1976
B 479,681	D 242,672	Mar. 16, 1976	Dec. 14, 1976
B 479,969	4,001,132	Mar. 9, 1976	Jan. 4, 1977
B 480,114	4,001,327	Mar. 2, 1976	Jan. 4, 1977
B 480,251	4,008,700	Mar. 23, 1976	Feb. 22, 1977
B 480,287	4,006,029	Mar. 30, 1976	Feb. 1, 1977
B 480,292	3,994,011	Mar. 16, 1976	Nov. 23, 1976
B 480,350	3,994,164	Feb. 10, 1976	Nov. 30, 1976
B 480,384	3,999,737	Mar. 23, 1976	Dec. 28, 1976
B 480,452	3,994,923	Feb. 10, 1976	Nov. 30, 1976
B 480,473	3,995,608	Mar. 2, 1976	Dec. 7, 1976
B 480,604	3,985,251	Jan. 13, 1976	Oct. 12, 1976
B 480,625	3,996,227	Feb. 24, 1976	Dec. 7, 1976
B 480,662	3,988,382	Mar. 2, 1976	Oct. 26, 1976
B 480,740	3,996,431	Mar. 2, 1976	Dec. 7, 1976
B 480,749	3,999,207	Mar. 9, 1976	Dec. 21, 1976
B 480,987	4,001,459	Mar. 30, 1976	Jan. 4, 1977
B 481,048	3,998,542	Mar. 16, 1976	Dec. 21, 1976
B 481,190	4,013,468	Mar. 30, 1976	Mar. 22, 1977
B 481,600	3,981,235	Jan. 27, 1976	Sep. 21, 1976
B 481,737	3,982,057	Jan. 13, 1976	Sep. 21, 1976
B 481,778	4,001,385	Mar. 30, 1976	Jan. 4, 1977
B 481,930	3,992,717	Feb. 24, 1976	Nov. 16, 1976
B 481,989	4,008,337	Mar. 23, 1976	Feb. 15, 1977
B 482,058	4,001,398	Mar. 2, 1976	Jan. 4, 1977
B 482,660	3,995,026	Feb. 10, 1976	Nov. 30, 1976
B 482,709	3,985,733	Feb. 24, 1976	Oct. 12, 1976
B 482,907	3,984,811	Jan. 20, 1976	Oct. 5, 1976
B 483,247	4,001,889	Apr. 13, 1976	Jan. 4, 1977
B 483,256	3,981,723	Feb. 10, 1976	Sep. 21, 1976
B 483,268	3,995,215	Mar. 9, 1976	Nov. 30, 1976
B 483,606	3,986,990	Jan. 27, 1976	Oct. 19, 1976
B 483,615	3,988,637	Jan. 27, 1976	Oct. 26, 1976
B 483,746	4,014,923	Mar. 23, 1976	Mar. 29, 1977
B 483,762	3,993,608	Feb. 10, 1976	Nov. 23, 1976
B 483,865	3,985,693	Jan. 13, 1976	Oct. 12, 1976
B 484,029	3,983,558	Feb. 10, 1976	Sep. 28, 1976
B 484,067	3,992,374	Feb. 17, 1976	Nov. 16, 1976
B 484,068	3,994,937	Mar. 2, 1976	Nov. 30, 1976
B 484,121	3,997,770	Mar. 16, 1976	Dec. 14, 1976
B 484,269	4,000,159	Feb. 10, 1976	Dec. 28, 1976
B 484,332	3,986,540	Mar. 2, 1976	Oct. 19, 1976
B 484,365	3,983,578	Jan. 27, 1976	Sep. 28, 1976
B 484,419	4,001,292	Mar. 9, 1976	Jan. 4, 1977
B 484,437	4,013,740	Mar. 30, 1976	Mar. 22, 1977
B 484,482	3,994,017	Mar. 23, 1976	Nov. 23, 1976
B 484,769	3,999,498	Mar. 16, 1976	Dec. 28, 1976
B 485,051	3,992,418	Feb. 17, 1976	Nov. 16, 1976
B 485,060	3,983,067	Feb. 17, 1976	Sep. 28, 1976
B 485,169	3,989,791	Mar. 16, 1976	Nov. 2, 1976
B 485,188	4,001,170	Mar. 16, 1976	Jan. 4, 1977
B 485,401	3,985,859	Jan. 27, 1976	Oct. 12, 1976
B 485,575	3,996,565	Feb. 24, 1976	Dec. 7, 1976
B 485,926	4,006,357	Mar. 23, 1976	Feb. 1, 1977
B 485,972	4,017,472	Mar. 23, 1976	Apr. 12, 1977
B 486,280	3,983,130	Feb. 3, 1976	Sep. 28, 1976
B 486,614	3,995,835	Feb. 17, 1976	Dec. 7, 1976
B 486,678	4,001,273	Mar. 2, 1976	Jan. 4, 1977
B 486,828	3,989,651	Mar. 2, 1976	Nov. 2, 1976
B 487,062	D 241,256	Feb. 10, 1976	Nov. 9, 1976
B 487,078	4,012,895	Mar. 30, 1976	Mar. 22, 1977
B 487,133	3,989,826	Jan. 27, 1976	Nov. 2, 1976
B 487,260	3,990,610	Jan. 27, 1976	Nov. 9, 1976
B 487,411	3,983,579	Feb. 24, 1976	Sep. 28, 1976
B 487,423	3,998,810	Mar. 2, 1976	Dec. 21, 1976
B 487,427	3,995,788	Mar. 2, 1976	Dec. 7, 1976
B 487,467	4,014,847	Apr. 13, 1976	Mar. 29, 1977
B 488,111	3,985,765	Jan. 13, 1976	Oct. 12, 1976
B 488,395	3,982,245	Jan. 27, 1976	Sep. 21, 1976
B 488,634	3,982,158	Jan. 20, 1976	Sep. 21, 1976

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 488,756	3,991,810	Mar. 16, 1976	Nov. 16, 1976
B 488,836	4,013,121	Mar. 30, 1976	Mar. 22, 1977
B 489,290	3,998,081	Feb. 17, 1976	Dec. 21, 1976
B 489,328	3,990,088	Jan. 20, 1976	Nov. 2, 1976
B 489,331	3,996,175	Feb. 17, 1976	Dec. 7, 1976
B 489,485	D 243,266	Apr. 13, 1976	Feb. 1, 1977
B 489,550	4,000,710	Mar. 16, 1976	Jan. 4, 1977
B 489,685	3,984,085	Feb. 24, 1976	Oct. 5, 1976
B 490,067	3,986,600	Jan. 27, 1976	Oct. 19, 1976
B 490,547	3,999,439	Feb. 24, 1976	Dec. 28, 1976
B 490,551	D 243,168	Apr. 6, 1976	Jan. 25, 1977
B 490,589	3,990,680	Feb. 3, 1976	Nov. 9, 1976
B 490,623	3,996,964	Mar. 2, 1976	Dec. 14, 1976
B 490,647	3,985,196	Feb. 24, 1976	Oct. 12, 1976
B 490,806	3,989,486	Feb. 3, 1976	Nov. 2, 1976
B 490,812	3,998,842	Mar. 30, 1976	Dec. 21, 1976
B 490,946	3,993,652	Feb. 17, 1976	Nov. 23, 1976
B 490,995	3,995,031	Feb. 3, 1976	Nov. 30, 1976
B 491,032	3,981,892	Feb. 10, 1976	Sep. 21, 1976
B 491,052	3,985,790	Mar. 2, 1976	Oct. 12, 1976
B 491,111	3,997,916	Feb. 17, 1976	Dec. 14, 1976
B 491,455	3,991,167	Feb. 3, 1976	Nov. 9, 1976
B 491,501	3,984,914	Jan. 13, 1976	Oct. 12, 1976
B 491,618	4,007,950	Mar. 16, 1976	Feb. 15, 1977
B 491,650	3,999,044	Mar. 9, 1976	Dec. 21, 1976
B 491,673	3,994,770	Feb. 17, 1976	Nov. 30, 1976
B 491,776	3,986,298	Mar. 16, 1976	Oct. 19, 1976
B 491,883	3,984,412	Feb. 3, 1976	Oct. 5, 1976
B 491,906	D 242,223	Feb. 10, 1976	Nov. 9, 1976
B 492,039	3,997,541	Feb. 24, 1976	Dec. 14, 1976
B 492,093	4,003,658	Mar. 23, 1976	Jan. 18, 1977
B 492,120	3,995,692	Feb. 24, 1976	Dec. 7, 1976
B 492,301	3,981,073	Jan. 13, 1976	Sep. 21, 1976
B 492,373	4,010,908	Mar. 30, 1976	Mar. 8, 1977
B 492,688	3,983,415	Jan. 20, 1976	Sep. 28, 1976
B 492,716	3,998,739	Mar. 2, 1976	Dec. 21, 1976
B 492,774	4,001,843	Mar. 9, 1976	Jan. 4, 1977
B 492,902	3,993,859	Feb. 24, 1976	Nov. 23, 1976
B 492,946	3,991,303	Jan. 27, 1976	Nov. 9, 1976
B 493,254	D 243,267	Apr. 13, 1976	Feb. 1, 1977
B 493,370	3,984,792	Mar. 16, 1976	Oct. 5, 1976
B 493,463	4,013,510	Mar. 23, 1976	Mar. 22, 1977
B 493,474	4,013,565	Mar. 23, 1976	Mar. 22, 1977
B 493,501	3,988,061	Feb. 3, 1976	Oct. 26, 1976
B 493,686	4,008,338	Mar. 23, 1976	Feb. 15, 1977
B 493,955	3,989,830	Mar. 9, 1976	Nov. 2, 1976
B 493,981	3,990,165	Mar. 9, 1976	Nov. 9, 1976
B 494,234	3,983,808	Feb. 10, 1976	Oct. 5, 1976
B 494,339	4,001,255	Mar. 16, 1976	Jan. 4, 1977
B 494,383	3,991,289	Feb. 3, 1976	Nov. 9, 1976
B 494,669	3,991,104	Feb. 3, 1976	Nov. 9, 1976
B 494,691	3,987,457	Mar. 16, 1976	Oct. 19, 1976
B 494,806	3,989,210	Feb. 3, 1976	Nov. 2, 1976
B 494,944	3,992,469	Feb. 17, 1976	Nov. 16, 1976
B 495,185	3,999,166	Mar. 9, 1976	Dec. 21, 1976
B 495,331	4,000,456	Mar. 16, 1976	Dec. 28, 1976
B 495,402	3,983,988	Feb. 17, 1976	Oct. 5, 1976
B 495,408	4,000,222	Feb. 3, 1976	Dec. 28, 1976
B 495,489	3,984,571	Feb. 3, 1976	Oct. 5, 1976
B 495,550	3,993,666	Feb. 3, 1976	Nov. 23, 1976
B 495,554	3,993,665	Feb. 3, 1976	Nov. 23, 1976
B 495,759	3,989,998	Feb. 3, 1976	Nov. 2, 1976
B 495,781	4,013,699	Mar. 23, 1976	Mar. 22, 1977
B 495,903	3,995,997	Feb. 17, 1976	Dec. 7, 1976
B 496,430	3,991,140	Feb. 10, 1976	Nov. 9, 1976
B 496,431	3,985,894	Jan. 13, 1976	Oct. 12, 1976
B 496,487	3,982,261	Jan. 20, 1976	Sep. 21, 1976
B 496,500	3,985,962	Feb. 3, 1976	Oct. 12, 1976
B 496,502	3,987,444	Jan. 20, 1976	Oct. 19, 1976
B 496,792	3,999,959	Feb. 17, 1976	Dec. 28, 1976
B 496,964	3,999,219	Apr. 20, 1976	Dec. 21, 1976
B 496,999	3,983,804	Jan. 27, 1976	Oct. 5, 1976
B 497,021	3,985,039	Jan. 13, 1976	Oct. 12, 1976
B 497,194	3,988,267	Feb. 3, 1976	Oct. 26, 1976
B 497,292	3,994,052	Feb. 3, 1976	Nov. 30, 1976
B 497,293	4,011,412	Mar. 30, 1976	Mar. 8, 1977
B 497,473	3,990,839	Feb. 3, 1976	Nov. 9, 1976
B 497,571	4,009,997	Mar. 23, 1976	Mar. 1, 1977
B 497,584	3,988,184	Feb. 24, 1976	Oct. 26, 1976
B 497,702	3,996,589	Mar. 2, 1976	Dec. 7, 1976
B 497,780	3,997,500	Feb. 24, 1976	Dec. 14, 1976
B 497,853	3,987,934	Feb. 17, 1976	Oct. 26, 1976
B 497,896	D 243,091	Apr. 6, 1976	Jan. 18, 1977
B 497,960	3,991,325	Jan. 20, 1976	Nov. 9, 1976
B 498,208	4,001,480	Apr. 13, 1976	Jan. 4, 1977
B 498,288	4,013,657	Mar. 23, 1976	Mar. 22, 1977
B 498,775	3,993,868	Mar. 2, 1976	Nov. 23, 1976
B 498,205	3,989,611	Feb. 10, 1976	Nov. 2, 1976
B 498,500	3,982,241	Jan. 20, 1976	Sep. 21, 1976
B 498,775	3,993,868	Mar. 2, 1976	Nov. 23, 1976
B 498,820	3,996,670	Mar. 9, 1976	Dec. 14, 1976
B 498,951	3,996,907	Mar. 2, 1976	Dec. 14, 1976
B 499,171	3,985,192	Jan. 27, 1976	Oct. 12, 1976
B 499,209	3,995,907	Feb. 24, 1976	Dec. 7, 1976
B 499,227	3,981,344	Jan. 27, 1976	Sep. 21, 1976
B 499,324	4,001,375	Mar. 16, 1976	Jan. 4, 1977
B 499,352	3,981,391	Jan. 27, 1976	Sep. 21, 1976
B 499,370	4,013,544	Mar. 30, 1976	Mar. 22, 1977
B 499,718	3,990,058	Jan. 27, 1976	Nov. 2, 1976
B 499,786	4,000,663	Mar. 16, 1976	Jan. 4, 1977
B 500,171	3,997,262	Mar. 30, 1976	Dec. 14, 1976
B 500,176	3,995,316	Feb. 3, 1976	Nov. 30, 1976
B 500,408	D 242,721	Mar. 16, 1976	Dec. 14, 1976
B 500,945	3,996,817	Feb. 24, 1976	Dec. 14, 1976
B 500,959	4,014,853	Apr. 13, 1976	Mar. 29, 1977
B 500,981	3,984,681	Jan. 27, 1976	Oct. 5, 1976
B 501,122	3,981,385	Feb. 17, 1976	Sep. 21, 1976
B 501,181	3,984,761	Feb. 10, 1976	Oct. 5, 1976
B 501,253	3,994,015	Feb. 3, 1976	Nov. 23, 1976
B 501,317	3,985,643	Jan. 13, 1976	Oct. 12, 1976
B 501,379	4,013,696	Mar. 30, 1976	Mar. 22, 1977
B 501,415	3,982,051	Jan. 13, 1976	Sep. 21, 1976
B 501,482	4,012,650	Jan. 13, 1976	Mar. 15, 1977
B 501,503	4,001,640	Mar. 2, 1976	Jan. 4, 1977
B 501,540	3,985,694	Jan. 13, 1976	Oct. 12, 1976
B 501,975	3,998,466	Mar. 2, 1976	Dec. 21, 1976
B 501,993	3,981,606	Jan. 13, 1976	Sep. 21, 1976
B 502,151	3,998,614	Mar. 23, 1976	Dec. 21, 1976
B 502,161	4,000,500	Mar. 2, 1976	Dec. 28, 1976
B 502,289	3,982,274	Jan. 13, 1976	Sep. 21, 1976
B 502,381	D 242,231	Mar. 16, 1976	Nov. 9, 1976
B 502,540	3,983,698	Jan. 13, 1976	Oct. 5, 1976
B 502,571	D 242,433	Apr. 6, 1976	Nov. 23, 1976
B 502,589	3,989,652	Jan. 27, 1976	Nov. 2, 1976
B 502,652	3,989,186	Feb. 24, 1976	Nov. 2, 1976
B 502,667	3,991,431	Feb. 24, 1976	Nov. 16, 1976
B 502,973	3,982,161	Jan. 27, 1976	Sep. 21, 1976
B 502,993	3,992,489	Feb. 17, 1976	Nov. 16, 1976
B 503,029	3,986,879	Jan. 27, 1976	Oct. 19, 1976
B 503,345	4,001,235	Feb. 24, 1976	Jan. 4, 1977
B 503,371	4,009,401	Mar. 30, 1976	Feb. 22, 1977
B 503,436	3,988,819	Feb. 24, 1976	Nov. 2, 1976
B 503,456	4,007,702	Mar. 23, 1976	Feb. 15, 1977
B 503,521	3,999,646	Mar. 16, 1976	Dec. 28, 1976
B 503,579	3,989,680	Feb. 10, 1976	Nov. 2, 1976
B 503,618	3,997,782	Mar. 9, 1976	Dec. 14, 1976
B 503,742	3,989,756	Feb. 17, 1976	Nov. 2, 1976
B 503,776	4,016,000	Mar. 23, 1976	Apr. 5, 1977
B 503,780	3,990,055	Mar. 16, 1976	Nov. 2, 1976
B 503,817	3,988,307	Jan. 13, 1976	Oct. 26, 1976
B 504,056	3,993,923	Feb. 24, 1976	Nov. 23, 1976
B 504,061	3,987,534	Mar. 16, 1976	Oct. 26, 1976
B 504,156	3,999,048	Mar. 23, 1976	Dec. 21, 1976
B 504,169	3,981,219	Jan. 13, 1976	Sep. 21, 1976
B 504,404	3,996,499	Feb. 24, 1976	Dec. 7, 1976
B 504,405	4,007,401	Apr. 13, 1976	Feb. 8, 1977
B 504,439	3,999,398	Mar. 16, 1976	Dec. 28, 1976
B 504,503	3,999,210	Mar. 9, 1976	Dec. 21, 1976
B 504,582	4,005,138	Mar. 30, 1976	Jan. 25, 1977
B 504,778	3,986,650	Feb. 24, 1976	Oct. 19, 1976
B 504,877	3,997,564	Feb. 24, 1976	Dec. 14, 1976
B 504,899	3,991,273	Mar. 9, 1976	Nov. 9, 1976
B 505,126	3,981,745	Feb. 10, 1976	Sep. 21, 1976
B 505,221	4,013,627	Mar. 30, 1976	Mar. 22, 1977
B 505,582	4,001,659	Mar. 23, 1976	Jan. 4, 1977
B 505,689	3,987,631	Mar. 2, 1976	Oct. 26, 1976
B 505,813	3,985,175	Jan. 13, 1976	Oct. 12, 1976
B 506,144	3,991,147	Feb. 10, 1976	Nov. 9, 1976
B 506,148	3,988,319	Feb. 3, 1976	Oct. 26, 1976
B 506,167	3,990,652	Feb. 10, 1976	Nov. 9, 1976
B 506,286	3,982,085	Jan. 20, 1976	Sep. 21, 1976
B 506,461	3,987,348	Jan. 20, 1976	Oct. 19, 1976
B 506,566	3,985,402	Jan. 20, 1976	Oct. 12, 1976
B 506,624	3,999,695	Mar. 9, 1976	Dec. 28, 1976
B 506,648	3,994,857	Feb. 3, 1976	Nov. 30, 1976
B 506,744	3,981,176	Jan. 13, 1976	Sep. 21, 1976
B 506,760	4,012,835	Apr. 13, 1976	Mar. 22, 1977
B 506,839	4,005,389	Mar. 23, 1976	Jan. 25, 1977
B 506,840	4,002,928	Mar. 23, 1976	Jan. 11, 1977
B 506,916	3,986,140	Feb. 3, 1976	Oct. 12, 1976
B 506,926	3,993,232	Feb. 17, 1976	Nov. 23, 1976
B 507,087	3,991,389	Feb. 17, 1976	Nov. 9, 1976
B 507,131	4,000,499	Mar. 2, 1976	Dec. 28, 1976
B 507,166	4,014,738	Apr. 13, 1976	Mar. 29, 1977

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 507,396	3,995,167	Feb. 10, 1976	Nov. 30, 1976
B 507,476	3,994,680	Feb. 10, 1976	Nov. 30, 1976
B 507,647	3,982,240	Jan. 27, 1976	Sep. 21, 1976
B 508,118	3,992,283	Feb. 17, 1976	Nov. 16, 1976
B 508,119	3,992,285	Feb. 17, 1976	Nov. 16, 1976
B 508,369	3,985,847	Jan. 13, 1976	Oct. 12, 1976
B 508,639	4,004,194	Mar. 23, 1976	Jan. 18, 1977
B 508,817	3,989,891	Feb. 3, 1976	Nov. 2, 1976
B 508,878	3,994,117	Feb. 3, 1976	Nov. 30, 1976
B 508,940	3,981,321	Feb. 17, 1976	Sep. 21, 1976
B 508,961	3,987,477	Feb. 3, 1976	Oct. 19, 1976
B 509,043	3,996,767	Feb. 24, 1976	Dec. 14, 1976
B 509,165	3,999,155	Mar. 2, 1976	Dec. 21, 1976
B 509,185	3,989,996	Feb. 3, 1976	Nov. 2, 1976
B 509,238	3,982,399	Feb. 24, 1976	Sep. 28, 1976
B 509,474	3,997,260	Feb. 17, 1976	Dec. 14, 1976
B 509,586	4,006,645	Feb. 3, 1976	Feb. 8, 1977
B 509,606	3,989,986	Feb. 3, 1976	Nov. 2, 1976
B 509,772	3,999,004	Mar. 16, 1976	Dec. 21, 1976
B 509,819	4,014,712	Apr. 13, 1976	Mar. 29, 1977
B 510,026	4,016,763	Apr. 13, 1976	Apr. 12, 1977
B 510,184	D 242,784	Apr. 6, 1976	Dec. 21, 1976
B 510,278	4,008,972	Mar. 30, 1976	Feb. 22, 1977
B 510,281	3,993,215	Mar. 9, 1976	Nov. 23, 1976
B 510,346	D 242,207	Feb. 10, 1976	Nov. 9, 1976
B 510,458	4,000,221	Feb. 10, 1976	Dec. 28, 1976
B 510,521	3,990,656	Mar. 2, 1976	Nov. 9, 1976
B 510,588	3,981,539	Jan. 27, 1976	Sep. 21, 1976
B 510,677	3,989,541	Feb. 24, 1976	Nov. 2, 1976
B 510,682	4,000,978	Mar. 30, 1976	Jan. 4, 1977
B 510,836	4,013,795	Mar. 23, 1976	Mar. 22, 1977
B 510,850	3,989,841	Feb. 3, 1976	Nov. 2, 1976
B 510,855	3,981,059	Jan. 27, 1976	Sep. 21, 1976
B 511,907	3,999,622	Mar. 30, 1976	Dec. 28, 1976
B 510,998	3,992,336	Feb. 10, 1976	Nov. 16, 1976
B 511,002	3,998,717	Mar. 2, 1976	Dec. 21, 1976
B 511,099	3,990,162	Feb. 3, 1976	Nov. 9, 1976
B 511,156	3,981,364	Jan. 27, 1976	Sep. 21, 1976
B 511,346	3,984,072	Jan. 27, 1976	Oct. 5, 1976
B 511,407	3,981,485	Feb. 10, 1976	Sep. 21, 1976
B 511,454	3,982,333	Feb. 24, 1976	Sep. 28, 1976
B 511,665	4,001,037	Mar. 2, 1976	Jan. 4, 1977
B 511,885	3,981,346	Jan. 27, 1976	Sep. 21, 1976
B 511,886	3,989,991	Feb. 3, 1976	Nov. 2, 1976
B 511,909	3,981,183	Feb. 17, 1976	Sep. 21, 1976
B 512,324	3,985,084	Feb. 17, 1976	Oct. 12, 1976
B 512,547	3,984,193	Jan. 13, 1976	Oct. 5, 1976
B 512,745	3,981,294	Jan. 13, 1976	Sep. 21, 1976
B 512,779	4,014,897	Apr. 13, 1976	Mar. 29, 1977
B 512,818	3,997,363	Apr. 6, 1976	Dec. 14, 1976
B 512,849	3,982,141	Feb. 3, 1976	Sep. 21, 1976
B 512,964	3,995,279	Feb. 10, 1976	Nov. 30, 1976
B 513,014	3,991,113	Feb. 10, 1976	Nov. 9, 1976
B 513,027	3,995,143	Feb. 17, 1976	Nov. 30, 1976
B 513,134	4,006,764	Mar. 23, 1976	Feb. 8, 1977
B 513,280	3,988,211	Jan. 20, 1976	Oct. 26, 1976
B 513,368	3,982,138	Feb. 3, 1976	Sep. 21, 1976
B 513,706	3,986,064	Jan. 13, 1976	Oct. 12, 1976
B 513,756	3,993,869	Feb. 3, 1976	Nov. 23, 1976
B 513,781	4,001,324	Feb. 24, 1976	Jan. 4, 1977
B 513,789	3,981,599	Feb. 3, 1976	Sep. 21, 1976
B 513,791	4,008,608	Mar. 30, 1976	Feb. 22, 1977
B 514,259	4,013,649	Mar. 23, 1976	Mar. 22, 1977
B 514,687	3,986,522	Jan. 27, 1976	Oct. 19, 1976
B 515,135	3,990,085	Feb. 17, 1976	Nov. 2, 1976
B 515,303	3,987,939	Jan. 20, 1976	Oct. 26, 1976
B 515,368	4,014,733	Apr. 6, 1976	Mar. 29, 1977
B 515,452	3,995,243	Feb. 10, 1976	Nov. 30, 1976
B 515,455	3,982,149	Jan. 27, 1976	Sep. 21, 1976
B 515,642	4,001,258	Feb. 24, 1976	Jan. 4, 1977
B 515,908	3,984,676	Jan. 20, 1976	Oct. 5, 1976
B 516,002	3,988,638	Jan. 13, 1976	Oct. 26, 1976
B 516,032	3,986,634	Jan. 27, 1976	Oct. 19, 1976
B 516,047	3,985,741	Feb. 10, 1976	Oct. 12, 1976
B 516,060	3,983,572	Feb. 17, 1976	Sep. 28, 1976
B 516,069	3,986,208	Mar. 16, 1976	Oct. 12, 1976
B 516,296	3,984,404	Feb. 3, 1976	Oct. 5, 1976
B 516,537	3,996,784	Feb. 17, 1976	Dec. 14, 1976
B 516,564	3,993,931	Feb. 17, 1976	Nov. 23, 1976
B 516,609	3,994,486	Feb. 24, 1976	Nov. 30, 1976
B 516,625	4,013,542	Mar. 30, 1976	Mar. 22, 1977
B 516,804	3,991,209	Mar. 23, 1976	Nov. 9, 1976
B 516,825	3,988,885	Feb. 3, 1976	Nov. 2, 1976
B 517,273	D 242,798	Mar. 16, 1976	Dec. 21, 1976
B 517,504	3,999,855	Mar. 9, 1976	Dec. 28, 1976
B 517,668	4,013,423	Apr. 6, 1976	Mar. 22, 1977
B 517,762	3,986,065	Mar. 16, 1976	Oct. 12, 1976
B 517,858	4,000,999	Feb. 17, 1976	Jan. 4, 1977
B 517,956	D 243,088	Apr. 6, 1976	Jan. 18, 1977
B 517,957	D 243,089	Apr. 6, 1976	Jan. 18, 1977
B 518,076	4,014,914	Mar. 30, 1976	Mar. 29, 1977
B 518,226	3,993,509	Feb. 10, 1976	Nov. 23, 1976
B 518,326	4,008,282	Mar. 23, 1976	Feb. 15, 1977
B 518,656	3,989,732	Feb. 17, 1976	Nov. 2, 1976
B 518,859	3,989,971	Feb. 3, 1976	Nov. 2, 1976
B 518,999	3,990,323	Feb. 3, 1976	Nov. 9, 1976
B 519,095	3,993,621	Feb. 24, 1976	Nov. 23, 1976
B 519,355	4,014,829	Apr. 13, 1976	Mar. 29, 1977
B 519,377	3,987,223	Jan. 27, 1976	Oct. 19, 1976
B 519,446	3,985,815	Feb. 24, 1976	Oct. 12, 1976
B 519,485	3,991,134	Feb. 10, 1976	Nov. 9, 1976
B 519,486	3,992,481	Feb. 17, 1976	Nov. 16, 1976
B 519,487	3,992,337	Feb. 17, 1976	Nov. 16, 1976
B 519,599	3,995,350	Feb. 17, 1976	Dec. 7, 1976
B 519,623	4,012,049	Apr. 6, 1976	Mar. 15, 1977
B 519,680	4,014,660	Mar. 30, 1976	Mar. 29, 1977
B 519,932	3,988,618	Feb. 3, 1976	Oct. 26, 1976
B 519,979	3,982,067	Feb. 3, 1976	Sep. 21, 1976
B 520,063	3,989,934	Mar. 2, 1976	Nov. 2, 1976
B 520,075	3,989,935	Feb. 24, 1976	Nov. 2, 1976
B 520,076	3,989,936	Mar. 2, 1976	Nov. 2, 1976
B 520,082	3,989,937	Mar. 23, 1976	Nov. 2, 1976
B 520,115	4,003,072	Mar. 23, 1976	Jan. 11, 1977
B 520,227	4,002,823	Mar. 30, 1976	Jan. 11, 1977
B 520,256	3,985,730	Jan. 13, 1976	Oct. 12, 1976
B 520,277	3,995,635	Feb. 17, 1976	Dec. 7, 1976
B 520,341	3,992,028	Mar. 16, 1976	Nov. 16, 1976
B 520,384	3,986,592	Jan. 27, 1976	Oct. 19, 1976
B 520,514	3,988,308	Mar. 9, 1976	Oct. 26, 1976
B 520,534	3,997,119	Feb. 17, 1976	Dec. 14, 1976
B 520,543	3,986,768	Jan. 27, 1976	Oct. 19, 1976
B 520,546	4,001,133	Mar. 2, 1976	Jan. 4, 1977
B 520,613	3,991,341	Mar. 16, 1976	Nov. 9, 1976
B 520,658	3,998,778	Mar. 9, 1976	Dec. 21, 1976
B 520,878	4,014,849	Apr. 6, 1976	Mar. 29, 1977
B 520,884	4,000,433	Mar. 16, 1976	Dec. 28, 1976
B 520,924	3,982,113	Jan. 27, 1976	Sep. 21, 1976
B 520,928	3,983,617	Jan. 13, 1976	Oct. 5, 1976
B 520,952	4,000,876	Mar. 16, 1976	Jan. 4, 1977
B 520,995	4,009,996	Mar. 23, 1976	Mar. 1, 1977
B 521,025	3,998,838	Mar. 23, 1976	Dec. 21, 1976
B 521 044	3,983,435	Feb. 24, 1976	Sep. 28, 1976
B 521,045	3,983,433	Feb. 24, 1976	Sep. 28, 1976
B 521,046	3,983,434	Feb. 24, 1976	Sep. 28, 1976
B 521,125	3,994,865	Feb. 10, 1976	Nov. 30, 1976
B 521,126	3,997,510	Feb. 10, 1976	Dec. 14, 1976
B 521,127	3,996,201	Feb. 17, 1976	Dec. 7, 1976
B 521,128	3,997,511	Feb. 10, 1976	Dec. 14, 1976
B 521,324	3,983,143	Jan. 27, 1976	Sep. 28, 1976
B 521,480	3,982,665	Jan. 13, 1976	Sep. 28, 1976
B 521,600	3,981,458	Jan. 27, 1976	Sep. 21, 1976
B 521,612	4,000,251	Mar. 9, 1976	Dec. 28, 1976
B 521,620	3,983,749	Jan. 27, 1976	Oct. 5, 1976
B 521,643	3,997,567	Mar. 2, 1976	Dec. 14, 1976
B 521,711	3,989,835	Feb. 10, 1976	Nov. 2, 1976
B 521,793	3,996,981	Feb. 24, 1976	Dec. 14, 1976
B 521,984	3,983,220	Feb. 17, 1976	Sep. 28, 1976
B 521,985	4,012,404	Mar. 23, 1976	Mar. 15, 1977
B 521,986	3,981,607	Feb. 3, 1976	Sep. 21, 1976
B 522,009	3,995,444	Feb. 17, 1976	Dec. 7, 1976
B 522,038	3,993,119	Feb. 3, 1976	Nov. 23, 1976
B 522,227	3,992,904	Mar. 30, 1976	Nov. 23, 1976
B 522,309	3,991,603	Feb. 3, 1976	Nov. 16, 1976
B 522,354	3,984,959	Jan. 20, 1976	Oct. 12, 1976
B 522,446	4,001,194	Mar. 30, 1976	Jan. 4, 1977
B 522,537	3,999,587	Mar. 30, 1976	Dec. 28, 1976
B 522,567	3,996,238	Feb. 17, 1976	Dec. 7, 1976
B 522,568	D 242,785	Apr. 6, 1976	Dec. 21, 1976
B 522,577	3,982,123	Jan. 27, 1976	Sep. 21, 1976
B 522,629	4,001,155	Mar. 16, 1976	Jan. 4, 1977
B 523,226	4,006,367	Mar. 23, 1976	Feb. 1, 1977
B 523,696	3,986,071	Jan. 13, 1976	Oct. 12, 1976
B 523,885	3,981,040	Feb. 17, 1976	Sep. 21, 1976
B 523,952	3,988,707	Mar. 23, 1976	Oct. 26, 1976
B 524,026	3,992,206	Feb. 10, 1976	Nov. 16, 1976
B 524,121	3,982,536	Feb. 3, 1976	Sep. 28, 1976
B 524,179	3,985,872	Jan. 13, 1976	Oct. 12, 1976
B 524,464	3,985,580	Feb. 10, 1976	Oct. 12, 1976
B 524,806	4,000,065	Mar. 2, 1976	Dec. 28, 1976
B 524,849	4,014,938	Mar. 23, 1976	Mar. 29, 1977
B 525,133	3,996,481	Mar. 23, 1976	Dec. 7, 1976
B 525,204	4,001,109	Mar. 16, 1976	Jan. 4, 1977
B 525,809	3,985,040	Feb. 24, 1976	Oct. 12, 1976
B 525,961	3,985,557	Jan. 13, 1976	Oct. 12, 1976

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 526,106	3,990,073	Jan. 27, 1976	Nov. 2, 1976
B 526,190	3,982,129	Feb. 17, 1976	Sep. 21, 1976
B 526,279	4,013,138	Apr. 13, 1976	Mar. 22, 1977
B 526,289	3,992,641	Feb. 24, 1976	Nov. 16, 1976
B 526,388	3,992,017	Feb. 3, 1976	Nov. 16, 1976
B 526,445	3,984,978	Jan. 20, 1976	Oct. 12, 1976
B 526,447	4,000,052	Feb. 24, 1976	Dec. 28, 1976
B 526,510	3,989,708	Jan. 20, 1976	Nov. 2, 1976
B 526,654	4,011,534	Mar. 23, 1976	Mar. 8, 1977
B 526,942	4,013,700	Mar. 30, 1976	Mar. 22, 1977
B 526,997	3,985,695	Jan. 13, 1976	Oct. 12, 1976
B 527,040	4,013,515	Mar. 23, 1976	Mar. 22, 1977
B 527,054	3,981,559	Feb. 17, 1976	Sep. 21, 1976
B 527,171	3,998,248	Mar. 9, 1976	Dec. 21, 1976
B 527,187	3,995,202	Feb. 17, 1976	Nov. 30, 1976
B 527,333	3,999,732	Mar. 23, 1976	Dec. 28, 1976
B 527,669	3,982,206	Jan. 13, 1976	Sep. 21, 1976
B 527,693	3,995,233	Feb. 3, 1976	Nov. 30, 1976
B 527,788	D 242,337	Feb. 10, 1976	Nov. 16, 1976
B 527,972	4,000,016	Mar. 9, 1976	Dec. 28, 1976
B 527,999	3,981,682	Feb. 3, 1976	Sep. 21, 1976
B 528,297	4,001,138	Mar. 16, 1976	Jan. 4, 1977
B 528,303	3,991,023	Feb. 10, 1976	Nov. 9, 1976
B 528,401	3,991,619	Feb. 3, 1976	Nov. 16, 1976
B 528,756	3,990,476	Feb. 3, 1976	Nov. 9, 1976
B 528,761	3,982,221	Feb. 10, 1976	Sep. 21, 1976
B 528,962	3,989,666	Feb. 24, 1976	Nov. 2, 1976
B 528,966	3,989,667	Feb. 24, 1976	Nov. 2, 1976
B 529,156	3,989,158	Jan. 13, 1976	Nov. 2, 1976
B 529,194	4,000,776	Mar. 23, 1976	Jan. 4, 1977
B 529,214	4,013,004	Apr. 20, 1976	Mar. 22, 1977
B 529,659	3,996,875	Feb. 24, 1976	Dec. 14, 1976
B 529,836	3,994,345	Feb. 3, 1976	Nov. 30, 1976
B 529,925	4,014,003	Mar. 30, 1976	Mar. 22, 1977
B 529,974	3,987,098	Feb. 17, 1976	Oct. 19, 1976
B 530,174	3,993,635	Feb. 24, 1976	Nov. 23, 1976
B 530,255	3,996,103	Mar. 2, 1976	Dec. 7, 1976
B 530,263	4,009,736	Mar. 30, 1976	Mar. 1, 1977
B 530,285	4,013,903	Apr. 6, 1976	Mar. 22, 1977
B 530,303	4,006,029	Mar. 23, 1976	Feb. 1, 1977
B 530,318	3,985,752	Jan. 13, 1976	Oct. 12, 1976
B 530,437	4,014,857	Apr. 13, 1976	Mar. 29, 1977
B 530,569	3,999,865	Mar. 16, 1976	Dec. 28, 1976
B 530,580	4,001,151	Mar. 2, 1976	Jan. 4, 1977
B 530,605	3,989,064	Feb. 3, 1976	Nov. 2, 1976
B 530,709	4,012,944	Apr. 6, 1976	Mar. 22, 1977
B 530,813	3,986,131	Feb. 17, 1976	Oct. 12, 1976
B 530,873	4,001,016	Feb. 17, 1976	Jan. 4, 1977
B 530,925	3,983,161	Feb. 24, 1976	Sep. 28, 1976
B 531,096	3,984,415	Feb. 10, 1976	Oct. 5, 1976
B 531,267	3,997,040	Feb. 24, 1976	Dec. 14, 1976
B 531,425	3,992,595	Feb. 3, 1976	Nov. 16, 1976
B 531,566	3,997,820	Mar. 16, 1976	Dec. 14, 1976
B 531,686	3,990,017	Mar. 23, 1976	Nov. 2, 1976
B 531,753	3,988,843	Mar. 2, 1976	Nov. 2, 1976
B 531,929	3,986,067	Jan. 20, 1976	Oct. 12, 1976
B 532,005	3,992,397	Feb. 24, 1976	Nov. 16, 1976
B 532,140	4,001,299	Mar. 2, 1976	Jan. 4, 1977
B 532,319	3,990,292	Feb. 3, 1976	Nov. 9, 1976
B 532,326	3,993,959	Mar. 23, 1976	Nov. 23, 1976
B 532,424	D 242,292	Feb. 10, 1976	Nov. 9, 1976
B 532,476	3,992,756	Feb. 3, 1976	Nov. 23, 1976
B 532,477	4,014,895	Apr. 13, 1976	Mar. 29, 1977
B 532,679	4,010,706	Apr. 6, 1976	Mar. 8, 1977
B 532,901	3,984,318	Jan. 13, 1976	Oct. 5, 1976
B 532,969	3,981,706	Jan. 13, 1976	Sep. 21, 1976
B 532,976	4,000,837	Mar. 23, 1976	Jan. 4, 1977
B 533,056	3,983,969	Jan. 13, 1976	Oct. 5, 1976
B 533,259	3,999,556	Feb. 24, 1976	Dec. 28, 1976
B 533,454	3,996,566	Mar. 2, 1976	Dec. 7, 1976
B 533,580	3,982,255	Feb. 3, 1976	Sep. 21, 1976
B 533,652	4,000,196	Mar. 23, 1976	Dec. 28, 1976
B 533,734	3,984,799	Jan. 27, 1976	Oct. 5, 1976
B 533,968	3,986,576	Jan. 27, 1976	Oct. 19, 1976
B 534,016	3,983,381	Feb. 3, 1976	Sep. 28, 1976
B 534,313	3,981,675	Jan. 27, 1976	Sep. 21, 1976
B 534,314	3,981,786	Feb. 10, 1976	Sep. 21, 1976
B 534,333	3,981,480	Feb. 17, 1976	Sep. 21, 1976
B 534,334	D 242,722	Mar. 16, 1976	Dec. 14, 1976
B 534,443	3,989,970	Jan. 27, 1976	Nov. 2, 1976
B 534,574	3,995,624	Feb. 24, 1976	Dec. 7, 1976
B 534,591	3,991,141	Feb. 17, 1976	Nov. 9, 1976
B 534,680	4,014,904	Apr. 20, 1976	Mar. 29, 1977
B 534,767	3,982,180	Feb. 3, 1976	Sep. 21, 1976
B 534,915	4,012,668	Mar. 23, 1976	Mar. 15, 1977
B 534,991	3,983,517	Jan. 27, 1976	Sep. 28, 1976
B 535,076	3,981,718	Jan. 20, 1976	Sep. 21, 1976
B 535,209	4,001,873	Mar. 16, 1976	Jan. 4, 1977
B 535,256	3,999,150	Mar. 23, 1976	Dec. 21, 1976
B 535,268	3,999,045	Mar. 30, 1976	Dec. 21, 1976
B 535,386	3,981,150	Jan. 13, 1976	Sep. 21, 1976
B 535,391	3,981,386	Jan. 27, 1976	Sep. 21, 1976
B 535,411	3,990,543	Feb. 24, 1976	Nov. 9, 1976
B 535,437	3,997,555	Feb. 24, 1976	Dec. 14, 1976
B 535,448	3,997,123	Mar. 16, 1976	Dec. 14, 1976
B 535,466	3,981,309	Jan. 27, 1976	Sep. 21, 1976
B 535,813	3,981,819	Jan. 27, 1976	Sep. 21, 1976
B 535,928	3,981,466	Jan. 13, 1976	Sep. 21, 1976
B 536,009	3,982,112	Jan. 27, 1976	Sep. 21, 1976
B 536,082	3,997,783	Mar. 16, 1976	Dec. 14, 1976
B 536,322	4,001,272	Mar. 23, 1976	Jan. 4, 1977
B 536,403	3,998,341	Mar. 23, 1976	Dec. 21, 1976
B 536,511	3,995,989	Mar. 9, 1976	Dec. 7, 1976
B 536,675	3,985,773	Jan. 20, 1976	Oct. 12, 1976
B 536,923	4,007,828	Mar. 30, 1976	Feb. 15, 1977
B 536,935	3,985,729	Jan. 13, 1976	Oct. 12, 1976
B 537,058	4,000,969	Mar. 23, 1976	Jan. 4, 1977
B 537,102	3,981,829	Jan. 13, 1976	Sep. 21, 1976
B 537,709	3,981,368	Jan. 13, 1976	Sep. 21, 1976
B 537,711	3,985,748	Jan. 13, 1976	Oct. 12, 1976
B 537,722	3,985,423	Feb. 3, 1976	Oct. 12, 1976
B 537,903	3,986,492	Jan. 20, 1976	Oct. 19, 1976
B 538,472	3,992,884	Feb. 3, 1976	Nov. 23, 1976
B 538,491	3,982,928	Feb. 17, 1976	Sep. 28, 1976
B 538,686	3,982,199	Jan. 13, 1976	Sep. 21, 1976
B 538,753	3,993,642	Feb. 10, 1976	Nov. 23, 1976
B 539,374	3,996,229	Mar. 9, 1976	Dec. 7, 1976
B 539,746	3,983,423	Feb. 17, 1976	Sep. 28, 1976
B 540,078	3,984,701	Jan. 13, 1976	Oct. 5, 1976
B 540,218	3,986,108	Feb. 10, 1976	Oct. 12, 1976
B 540,632	3,981,600	Jan. 13, 1976	Sep. 21, 1976
B 540,703	4,013,206	Apr. 13, 1976	Mar. 22, 1977
B 540,767	3,986,010	Mar. 16, 1976	Oct. 12, 1976
B 540,872	3,982,135	Jan. 20, 1976	Sep. 21, 1976
B 540,888	4,005,528	Mar. 30, 1976	Feb. 1, 1977
B 541,015	3,993,208	Jan. 27, 1976	Nov. 23, 1976
B 541,376	3,981,690	Feb. 17, 1976	Sep. 21, 1976
B 541,415	3,982,080	Feb. 3, 1976	Sep. 21, 1976
B 541,464	3,995,424	Feb. 17, 1976	Dec. 7, 1976
B 541,496	3,982,232	Jan. 27, 1976	Sep. 21, 1976
B 541,501	4,005,826	Apr. 13, 1976	Feb. 1, 1977
B 541,517	3,986,156	Jan. 13, 1976	Oct. 12, 1976
B 541,710	3,994,472	Feb. 24, 1976	Nov. 30, 1976
B 542,135	3,986,939	Feb. 10, 1976	Oct. 19, 1976
B 542,158	3,981,886	Jan. 13, 1976	Sep. 21, 1976
B 542,226	3,993,748	Feb. 24, 1976	Nov. 23, 1976
B 542,258	4,013,536	Mar. 23, 1976	Mar. 22, 1977
B 543,078	3,995,687	Feb. 17, 1976	Dec. 7, 1976
B 543,941	3,985,528	Jan. 13, 1976	Oct. 12, 1976
B 544,034	3,997,175	Feb. 17, 1976	Dec. 14, 1976
B 544,476	3,993,585	Feb. 24, 1976	Nov. 23, 1976
B 544,899	3,994,962	Feb. 17, 1976	Nov. 30, 1976
B 544,961	3,983,492	Jan. 13, 1976	Sep. 28, 1976
B 545,050	3,982,073	Jan. 20, 1976	Sep. 21, 1976
B 545,265	D 243,090	Apr. 13, 1976	Jan. 18, 1977
B 545,299	4,001,259	Feb. 24, 1976	Jan. 4, 1977
B 545,344	4,012,746	Mar. 30, 1976	Mar. 15, 1977
B 545,464	3,992,387	Feb. 10, 1976	Nov. 16, 1976
B 545,630	3,981,337	Jan. 27, 1976	Sep. 21, 1976
B 545,777	4,004,906	Jan. 27, 1976	Jan. 25, 1977
B 545,856	4,006,939	Mar. 30, 1976	Feb. 8, 1977
B 545,935	3,990,337	Jan. 27, 1976	Nov. 9, 1976
B 545,945	3,995,260	Jan. 27, 1976	Nov. 30, 1976
B 546,097	3,999,309	Mar. 23, 1976	Dec. 28, 1976
B 546,295	3,987,070	Jan. 20, 1976	Oct. 19, 1976
B 546,426	3,982,063	Jan. 27, 1976	Sep. 21, 1976
B 546,631	3,983,729	Feb. 3, 1976	Oct. 5, 1976
B 546,665	3,990,062	Jan. 20, 1976	Nov. 2, 1976
B 546,677	4,015,654	Apr. 6, 1976	Apr. 5, 1977
B 546,911	3,981,058	Jan. 13, 1976	Sep. 21, 1976
B 546,922	3,987,742	Mar. 16, 1976	Oct. 26, 1976
B 547,016	3,999,741	Mar. 23, 1976	Dec. 28, 1976
B 547,208	4,001,218	Feb. 24, 1976	Jan. 4, 1977
B 547,547	3,997,670	Feb. 24, 1976	Dec. 14, 1976
B 547,994	3,990,081	Jan. 20, 1976	Nov. 2, 1976
B 548,028	3,991,517	Feb. 3, 1976	Nov. 16, 1976
B 548,058	3,983,050	Feb. 17, 1976	Sep. 28, 1976
B 548,155	3,981,477	Jan. 13, 1976	Sep. 21, 1976
B 548,440	3,993,401	Feb. 3, 1976	Nov. 23, 1976
B 548,302	3,983,414	Feb. 17, 1976	Sep. 28, 1976
B 548,440	3,993,401	Feb. 3, 1976	Nov. 23, 1976
B 548,462	D 242,283	Feb. 10, 1976	Nov. 9, 1976
B 548,688	3,995,984	Mar. 9, 1976	Dec. 7, 1976
B 548,719	3,990,553	Feb. 17, 1976	Nov. 9, 1976

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 548,978	3,998,139	Mar. 9, 1976	Dec. 21, 1976
B 549,198	3,981,975	Jan. 13, 1976	Sep. 21, 1976
B 549,244	3,981,125	Jan. 27, 1976	Sep. 21, 1976
B 549,394	3,981,611	Jan. 27, 1976	Sep. 21, 1976
B 549,931	3,986,141	Jan. 20, 1976	Oct. 12, 1976
B 549,964	3,995,899	Feb. 24, 1976	Dec. 7, 1976
B 550,693	3,982,194	Jan. 20, 1976	Sep. 21, 1976
B 550,744	3,993,550	Feb. 17, 1976	Nov. 23, 1976
B 550,810	4,000,910	Mar. 23, 1976	Jan. 4, 1977
B 551,133	3,996,740	Mar. 2, 1976	Dec. 14, 1976
B 551,463	3,996,254	Feb. 17, 1976	Dec. 7, 1976
B 551,527	3,982,599	Jan. 13, 1976	Sep. 28, 1976
B 551,809	3,996,743	Feb. 24, 1976	Dec. 14, 1976
B 551,952	Re. 29,059	Mar. 2, 1976	Dec. 7, 1976
B 552,006	3,992,129	Feb. 3, 1976	Nov. 16, 1976
B 552,489	3,994,864	Feb. 10, 1976	Nov. 30, 1976
B 552,498	3,983,139	Jan. 13, 1976	Sep. 28, 1976
B 552,508	4,001,250	Mar. 16, 1976	Jan. 4, 1977
B 552,629	3,994,773	Mar. 23, 1976	Nov. 30, 1976
B 552,709	4,001,467	Mar. 23, 1976	Jan. 4, 1977
B 552,932	3,989,292	Feb. 3, 1976	Nov. 2, 1976
B 553,421	4,001,146	Mar. 23, 1976	Jan. 4, 1977
B 553,460	3,990,019	Feb. 3, 1976	Nov. 2, 1976
B 553,584	3,992,456	Feb. 17, 1976	Nov. 16, 1976
B 553,629	3,999,242	Feb. 24, 1976	Dec. 28, 1976
B 554,039	3,999,944	Feb. 24, 1976	Dec. 28, 1976
B 554,164	4,001,465	Mar. 9, 1976	Jan. 4, 1977
B 554,283	3,981,152	Jan. 27, 1976	Sep. 21, 1976
B 554,291	4,001,209	Mar. 9, 1976	Jan. 4, 1977
B 554,380	4,001,147	Mar. 9, 1976	Jan. 4, 1977
B 554,594	3,985,960	Jan. 20, 1976	Oct. 12, 1976
B 554,655	4,015,048	Feb. 24, 1976	Mar. 29, 1977
B 554,848	4,001,265	Feb. 24, 1976	Jan. 4, 1977
B 554,939	3,994,013	Feb. 10, 1976	Nov. 23, 1976
B 555,146	4,007,636	Apr. 20, 1976	Feb. 15, 1977
B 555,437	3,991,152	Feb. 3, 1976	Nov. 9, 1976
B 555,456	3,993,423	Mar. 30, 1976	Nov. 23, 1976
B 555,772	3,982,641	Jan. 13, 1976	Sep. 28, 1976
B 556,057	3,985,349	Jan. 13, 1976	Oct. 12, 1976
B 556,496	3,990,244	Mar. 16, 1976	Nov. 9, 1976
B 556,897	3,992,972	Feb. 3, 1976	Nov. 23, 1976
B 557,153	3,991,603	Feb. 3, 1976	Nov. 16, 1976
B 557,274	4,016,375	Mar. 23, 1976	Apr. 5, 1977
B 557,299	3,990,357	Feb. 3, 1976	Nov. 9, 1976
B 557,621	3,990,800	Feb. 3, 1976	Nov. 9, 1976
B 557,721	4,013,435	Mar. 23, 1976	Mar. 22, 1977
B 557,856	3,991,019	Feb. 10, 1976	Nov. 9, 1976
B 558,220	3,990,009	Jan. 27, 1976	Nov. 2, 1976
B 558,251	3,981,289	Jan. 13, 1976	Sep. 21, 1976
B 558,813	3,989,188	Feb. 3, 1976	Nov. 2, 1976
B 558,818	3,983,762	Jan. 13, 1976	Oct. 5, 1976
B 558,819	3,990,160	Feb. 3, 1976	Nov. 9, 1976
B 558,973	3,981,126	Feb. 10, 1976	Sep. 21, 1976
B 559,111	3,984,854	Feb. 24, 1976	Oct. 5, 1976
B 559,142	4,001,124	Mar. 2, 1976	Jan. 4, 1977
B 559,394	4,016,094	Apr. 20, 1976	Apr. 5, 1977
B 559,441	4,013,609	Mar. 23, 1976	Mar. 22, 1977
B 559,631	4,011,406	Mar. 23, 1976	Mar. 8, 1977
B 559,697	3,995,770	Mar. 16, 1976	Dec. 7, 1976
B 559,700	4,001,189	Mar. 23, 1976	Jan. 4, 1977
B 559,701	4,001,190	Mar. 23, 1976	Jan. 4, 1977
B 559,737	3,984,668	Jan. 20, 1976	Oct. 5, 1976
B 559,954	3,982,673	Feb. 3, 1976	Sep. 28, 1976
B 560,261	3,987,493	Mar. 16, 1976	Oct. 19, 1976
B 560,488	3,989,940	Mar. 16, 1976	Nov. 2, 1976
B 560,717	3,982,034	Feb. 10, 1976	Sep. 21, 1976
B 560,765	3,983,389	Feb. 3, 1976	Sep. 28, 1976
B 561,062	D 242,248	Feb. 10, 1976	Nov. 9, 1976
B 561,165	4,013,002	Mar. 30, 1976	Mar. 22, 1977
B 561,166	4,011,809	Mar. 30, 1976	Mar. 15, 1977
B 561,365	4,005,078	Apr. 13, 1976	Jan. 25, 1977
B 561,387	3,985,706	Feb. 10, 1976	Oct. 12, 1976
B 561,405	4,003,770	Mar. 30, 1976	Jan. 18, 1977
B 561,712	3,992,126	Feb. 17, 1976	Nov. 16, 1976
B 561,732	3,991,460	Feb. 3, 1976	Nov. 16, 1976
B 561,764	3,984,634	Jan. 27, 1976	Oct. 5, 1976
B 561,770	4,000,366	Mar. 16, 1976	Dec. 28, 1976
B 561,784	3,984,710	Jan. 27, 1976	Oct. 5, 1976
B 562,413	4,000,930	Mar. 16, 1976	Jan. 4, 1977
B 562,462	3,985,836	Jan. 13, 1976	Oct. 12, 1976
B 562,519	4,013,125	Mar. 30, 1976	Mar. 22, 1977
B 562,601	3,998,360	Mar. 16, 1976	Dec. 21, 1976
B 562,698	3,983,972	Jan. 13, 1976	Oct. 5, 1976
B 562,813	3,985,491	Feb. 3, 1976	Oct. 12, 1976
B 563,070	3,996,230	Mar. 9, 1976	Dec. 7, 1976
B 563,165	4,000,977	Mar. 9, 1976	Jan. 4, 1977
B 563,244	3,983,562	Jan. 27, 1976	Sep. 28, 1976
B 563,301	3,995,589	Feb. 17, 1976	Dec. 7, 1976
B 563,412	3,992,127	Feb. 24, 1976	Nov. 16, 1976
B 563,419	3,999,051	Mar. 23, 1976	Dec. 21, 1976
B 563,722	3,990,925	Jan. 13, 1976	Nov. 9, 1976
B 563,780	3,987,769	Feb. 3, 1976	Oct. 26, 1976
B 563,932	4,000,638	Mar. 23, 1976	Jan. 4, 1977
B 564,252	4,001,293	Mar. 2, 1976	Jan. 4, 1977
B 564,255	4,015,996	Mar. 30, 1976	Apr. 5, 1977
B 564,314	3,984,996	Jan. 20, 1976	Oct. 12, 1976
B 564,902	4,001,351	Mar. 23, 1976	Jan. 4, 1977
B 565,180	3,981,685	Jan. 27, 1976	Sep. 21, 1976
B 565,275	3,990,299	Apr. 6, 1976	Nov. 9, 1976
B 565,717	3,999,138	Apr. 13, 1976	Dec. 21, 1976
B 565,754	4,011,626	Mar. 30, 1976	Mar. 15, 1977
B 566,464	3,996,367	Feb. 3, 1976	Dec. 7, 1976
B 566,556	3,998,511	Mar. 23, 1976	Dec. 21, 1976
B 566,572	3,988,590	Mar. 16, 1976	Oct. 26, 1976
B 566,585	4,001,083	Mar. 2, 1976	Jan. 4, 1977
B 567,058	3,985,188	Jan. 13, 1976	Oct. 12, 1976
B 567,076	4,011,187	Mar. 23, 1976	Mar. 8, 1977
B 567,158	3,988,073	Mar. 23, 1976	Oct. 26, 1976
B 567,207	3,991,689	Apr. 13, 1976	Nov. 16, 1976
B 567,435	3,995,724	Feb. 3, 1976	Dec. 7, 1976
B 567,854	3,985,038	Feb. 3, 1976	Oct. 12, 1976
B 567,892	4,000,855	Mar. 16, 1976	Jan. 4, 1977
B 568,226	3,992,698	Feb. 24, 1976	Nov. 16, 1976
B 568,770	3,982,213	Feb. 10, 1976	Sep. 21, 1976
B 569,125	3,986,980	Feb. 24, 1976	Oct. 19, 1976
B 569,293	4,004,149	Mar. 30, 1976	Jan. 18, 1977
B 569,501	3,999,250	Mar. 9, 1976	Dec. 28, 1976
B 569,519	3,993,133	Feb. 3, 1976	Nov. 23, 1976
B 569,646	3,985,222	Jan. 13, 1976	Oct. 12, 1976
B 569,859	3,994,160	Mar. 9, 1976	Nov. 30, 1976
B 570,172	3,987,763	Feb. 3, 1976	Oct. 26, 1976
B 570,615	3,998,570	Mar. 23, 1976	Dec. 21, 1976
B 570,862	3,991,639	Feb. 24, 1976	Nov. 16, 1976
B 571,219	3,991,388	Feb. 24, 1976	Nov. 9, 1976
B 571,638	4,001,244	Mar. 9, 1976	Jan. 4, 1977
B 571,659	3,995,186	Apr. 13, 1976	Nov. 30, 1976
B 572,642	3,990,715	Feb. 10, 1976	Nov. 9, 1976
B 572,726	4,015,020	Feb. 24, 1976	Mar. 29, 1977
B 573,033	3,995,224	Mar. 23, 1976	Nov. 30, 1976
B 573,114	4,014,843	Apr. 6, 1976	Mar. 29, 1977
B 573,991	4,013,704	Mar. 30, 1976	Mar. 22, 1977
B 573,994	4,000,641	Mar. 23, 1976	Jan. 4, 1977
B 574,128	3,982,961	Feb. 17, 1976	Sep. 28, 1976
B 574,616	4,000,424	Mar. 2, 1976	Dec. 28, 1976
B 574,996	3,989,718	Feb. 17, 1976	Nov. 2, 1976
B 575,583	4,000,928	Mar. 16, 1976	Jan. 4, 1977
B 575,757	3,981,170	Jan. 27, 1976	Sep. 21, 1976
B 575,761	4,013,123	Apr. 13, 1976	Mar. 22, 1977
B 575,776	4,013,124	Apr. 20, 1976	Mar. 22, 1977
B 575,851	3,985,826	Feb. 10, 1976	Oct. 12, 1976
B 576,385	4,009,498	Mar. 30, 1976	Mar. 1, 1977
B 576,859	3,991,526	Feb. 24, 1976	Nov. 16, 1976
B 576,903	3,995,032	Feb. 3, 1976	Nov. 30, 1976
B 578,447	3,982,658	Jan. 20, 1976	Sep. 28, 1976
B 579,104	3,982,081	Jan. 27, 1976	Sep. 21, 1976
B 579,116	3,986,227	Feb. 3, 1976	Oct. 19, 1976
B 579,153	4,013,745	Mar. 30, 1976	Mar. 22, 1977
B 579,806	3,995,318	Feb. 3, 1976	Nov. 30, 1976
B 580,379	4,000,796	Apr. 6, 1976	Jan. 4, 1977
B 580,826	3,988,391	Feb. 17, 1976	Oct. 26, 1976
B 580,921	3,984,054	Jan. 13, 1976	Oct. 5, 1976
B 581,843	4,000,562	Mar. 16, 1976	Jan. 4, 1977
B 583,051	3,990,714	Feb. 3, 1976	Nov. 9, 1976
B 583,089	3,982,174	Jan. 27, 1976	Sep. 21, 1976
B 583,712	3,995,064	Feb. 10, 1976	Nov. 30, 1976
B 584,520	3,981,149	Jan. 27, 1976	Sep. 21, 1976
B 584,997	4,000,030	Mar. 9, 1976	Dec. 28, 1976
B 585,247	3,989,914	Feb. 3, 1976	Nov. 2, 1976
B 585,731	3,993,603	Feb. 3, 1976	Nov. 23, 1976
B 586,215	3,985,302	Jan. 20, 1976	Oct. 12, 1976
B 586,380	3,983,885	Mar. 2, 1976	Oct. 5, 1976
B 586,387	3,981,311	Feb. 3, 1976	Sep. 21, 1976
B 586,663	3,992,080	Feb. 3, 1976	Nov. 16, 1976
B 587,118	Re. 29,067	Mar. 2, 1976	Dec. 7, 1976
B 587,786	3,991,204	Feb. 17, 1976	Nov. 9, 1976
B 587,936	3,999,052	Mar. 23, 1976	Dec. 21, 1976
B 589,179	4,001,102	Mar. 23, 1976	Jan. 4, 1977
B 589,687	3,995,349	Mar. 23, 1976	Dec. 7, 1976
B 589,966	3,985,828	Feb. 17, 1976	Oct. 12, 1976
B 590,158	3,985,163	Feb. 10, 1976	Oct. 12, 1976
B 590,159	3,985,164	Feb. 3, 1976	Oct. 12, 1976
B 590,502	4,001,171	Mar. 23, 1976	Jan. 4, 1977
B 591,141	4,013,631	Mar. 23, 1976	Mar. 22, 1977
B 592,143	3,984,713	Jan. 27, 1976	Oct. 5, 1976

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE	DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 592,146	4,001,084	Mar. 2, 1976	Jan. 4, 1977	B 657,438	3,985,701	Jan. 20, 1976	Oct. 12, 1976
B 592,658	4,001,164	Mar. 23, 1976	Jan. 4, 1977	B 747,785	3,981,899	Feb. 10, 1976	Sep. 21, 1976
B 593,781	4,015,953	Mar. 16, 1976	Apr. 5, 1977	B 750,679	4,007,049	Mar. 23, 1976	Feb. 8, 1977
B 594,871	3,999,245	Mar. 16, 1976	Dec. 28, 1976	B 843,038	3,981,785	Feb. 3, 1976	Sep. 21, 1976
B 596,692	3,992,349	Feb. 17, 1976	Nov. 16, 1976	B 845,044	4,001,338	Mar. 30, 1976	Jan. 4, 1977
B 597,410	4,000,925	Mar. 30, 1976	Jan. 4, 1977	B 848,336	3,993,752	Mar. 30, 1976	Nov. 23, 1976

LIST OF REISSUE PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 12TH DAY OF APRIL, 1977

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

Arthur D. Little, Inc.: *See*—
Loeffler, Herbert H., Re. 29,176.

Clark, Wallace. Moineau pump with rotating outer member. Re. 29,180, Cl. 418-48.000.

Colwill, Richard H. Sheet recirculator. Re. 29,178, Cl. 271-6.000.

Davidge, Ronald V.; Hobgood, George W.; Queener, Carl A.; Spears, Jesse W.; and Thompson, Bernard G., to International Business Machines Corporation. Reproduction apparatus incorporating alternate redevelopment and reimaging cycles for multiple copies. Re. 29,179, Cl. 355-14.000.

Dixon, Charles H., III, to RBP Chemical Corporation. Method of preparing printed circuit boards with terminal tabs. Re. 29,181, Cl. 156-656.000.

Greneker, Gene, III. Telephone range expander. Re. 29,183, Cl. 179-41.00A.

Hobgood, George W.: *See*—
Davidge, Ronald V.; Hobgood, George W.; Queener, Carl A.; Spears, Jesse W.; and Thompson, Bernard G., Re. 29,179.

International Business Machines Corporation: *See*—
Davidge, Ronald V.; Hobgood, George W.; Queener, Carl A.; Spears, Jesse W.; and Thompson, Bernard G., Re. 29,179.

Loeffler, Herbert H., to Arthur D. Little, Inc. Product pressurized compressed air dispenser. Re. 29,176, Cl. 222-389.000.

McCune, Homer W.; and Tucker, Nathaniel B., to Procter & Gamble Company, The. Oral composition for calculus retardation. Re. 29,182, Cl. 424-49.000.

Michaelis, Theodore Donald, to RCA Corporation. Solar torque compensation for a satellite. Re. 29,177, Cl. 244-166.000.

Procter & Gamble Company, The: *See*—
McCune, Homer W.; and Tucker, Nathaniel B., Re. 29,182.

Queener, Carl A.: *See*—
Davidge, Ronald V.; Hobgood, George W.; Queener, Carl A.; Spears, Jesse W.; and Thompson, Bernard G., Re. 29,179.

RBP Chemical Corporation: *See*—
Dixon, Charles H., III, Re. 29,181.

RCA Corporation: *See*—
Michaelis, Theodore Donald, Re. 29,177.

Spears, Jesse W.: *See*—
Davidge, Ronald V.; Hobgood, George W.; Queener, Carl A.; Spears, Jesse W.; and Thompson, Bernard G., Re. 29,179.

Tauer, Kenneth A. Compact lift for van. Re. 29,175, Cl. 214-77.00R.

Thompson, Bernard G.: *See*—
Davidge, Ronald V.; Hobgood, George W.; Queener, Carl A.; Spears, Jesse W.; and Thompson, Bernard G., Re. 29,179.

Tucker, Nathaniel B.: *See*—
McCune, Homer W.; and Tucker, Nathaniel B., Re. 29,182.

LIST OF PLANT PATENTEES

Buck, Griffith J., to Iowa State University Research Foundation, Inc. Geranium plant named Pearlie Mae Red. 4,039, 4-12-77, Cl. 68.000.

Buck, Griffith J., to Iowa State University Research Foundation, Inc. Geranium plant named Hazel. 4,040, 4-12-77, Cl. 68.000.

Buck, Griffith J., to Iowa State University Research Foundation, Inc. Geranium plant named Marian. 4,041, 4-12-77, Cl. 68.000.

Iowa State University Research Foundation, Inc.: *See*—
Buck, Griffith J., 4,039.
Buck, Griffith J., 4,040.
Buck, Griffith J., 4,041.

Lake County Nursery Exchange, Inc.: *See*—
Zampini, James W., 4,038.

Zampini, James W., to Lake County Nursery Exchange, Inc. Flowering crab apple tree. 4,038, 4-12-77, Cl. 34.000.

LIST OF DESIGN PATENTEES

AB Alga: *See*—
Krumlinde, Jockum, 244,046.

Acme-Hamilton Manufacturing Corporation: *See*—
Elson, Arthur M., 244,033.

Aeschlimann, Hans-Peter, to Dr. Molter GmbH. Dispensing container. 244,008, 4-12-77, Cl. D9-3.000.

AGFA-Gevaert, A.G.: *See*—
Wilsch, Herbert; and Sylla, Jurgen, 244,023.

Ahrens, Claude W. Amusement ride apparatus. 244,044, 4-12-77, Cl. D34-5.00L.

American Home Products Corporation: *See*—
Zephries, Z. George, 243,995.
Zephries, Z. George, 243,996.
Zephries, Z. George, 243,997.
Zephries, Z. George, 243,998.
Zephries, Z. George, 243,999.
Zephries, Z. George, 244,000.
Zephries, Z. George, 244,001.

American Hospital Supply Corporation: *See*—
Aul, Robert J.; Babington, Robert S.; Dunlap, Glenn H.; and Zitkus, Wayne J., 244,057.

Audeguy, Maurice, to Etablissements Doret S.A. Protective folder having transparent pockets. 244,024, 4-12-77, Cl. D19-27.000.

Audiotronics Corporation: *See*—
Warner, Donald E.; and Oyama, George C., 244,037.

Aul, Robert J.; Babington, Robert S.; Dunlap, Glenn H.; and Zitkus, Wayne J., to American Hospital Supply Corporation. Nebulizer cover or similar article. 244,057, 4-12-77, Cl. D24-62.000.

Ault, Charles Michael, to Termiflex Corporation. Telephone coupler — carrying case and hand-held computer terminal. 244,035, 4-12-77, Cl. D14-65.000.

Babington, Robert S.: *See*—
Aul, Robert J.; Babington, Robert S.; Dunlap, Glenn H.; and Zitkus, Wayne J., 244,057.

Baughman, Gary E., to Malm Fireplaces, Inc. Free standing fireplace. 244,031, 4-12-77, Cl. D23-97.000.

Baxter, Earl, to Scott & Fetzer Company, The. Knife caddy. 243,992, 4-12-77, Cl. D7-74.000.

Benkoe, Erwin: *See*—
Goldfarb, Adolph E.; and Benkoe, Erwin, 244,042.

Boeing Company, The: *See*—
Greiss, Rashad Shaker; and Yates, James Stephen, 244,018.

Boldt, Melvin H.; and Chuboff, David P., to Zenith Radio Corporation. Television receiver. 244,052, 4-12-77, Cl. D14-80.000.

Bonin, Bernard R. Cork retriever. 244,002, 4-12-77, Cl. D8-42.000.

Bott, John A. License plate holder. 244,017, 4-12-77, Cl. D12-193.000.

Brown, Robert I. Refrigerated display case. 243,985, 4-12-77, Cl. D6-187.000.

Brown, Robert I. Refrigerated display case. 244,019, 4-12-77, Cl. D15-81.000.

Cake, Arthur F.; Levine, Morris M.; Rolny, Alena; and Rolny, Paul, to Uranus Electronics Inc. Combined watch and calculator. 244,012, 4-12-77, Cl. D10-31.000.

Candle Corporation of America: *See*—
Kayne, Marvin L., 244,009.

Carter, Roland P., to Lane Company, Inc., The. Hexagonal commode. 243,979, 4-12-77, Cl. D6-146.000.

Carter, Roland P., to Lane Company, Inc., The. Dresser. 243,981, 4-12-77, Cl. D6-166.000.

Carter, Roland P., to Lane Company, Inc., The. Cocktail table. 243,982, 4-12-77, Cl. D6-177.000.
Carter, Roland P., to Lane Company, Inc., The. Table. 243,983, 4-12-77, Cl. D6-177.000.
Carter, Roland P., to Lane Company, Inc., The. Bed headboard. 243,987, 4-12-77, Cl. D6-198.000.
Christen Incorporated: *See—*
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Christen, Louis J., Jr., to Christen Incorporated. Plant display table. 243,984, 4-12-77, Cl. D6-179.000.
Chuboff, David P.: *See—*
Boldt, Melvin H.; and Chuboff, David P., 244,052.
Cohen, Bernard. Photograph holder. 243,989, 4-12-77, Cl. D6-234.000.
Copeland, Greg. Frame molding. 243,988, 4-12-77, Cl. D6-232.000.
Corning Glass Works: *See—*
Mankowski, Joseph A. A., 243,980.
Dassler, Horst Rudolf, to Fabriques de Chaussures de Sport S.A.R.L. Athletic shoe or the like. 243,976, 4-12-77, Cl. D2-311.000.
Daverin, Donald R.; and Powell, Mikel R. Riding toy. 244,047, 4-12-77, Cl. D34-15.0AJ.
Daverin, Donald R. Scooter. 244,048, 4-12-77, Cl. D34-15.0AT.
Deetz, Niles Ellis; and Garcia, Arcadio Alvarez, to Stack Heater's Inc. Heat saving unit for use with furnaces or the like. 244,032, 4-12-77, Cl. D23-127.000.
De Filippis, John, to International Telephone and Telegraph Corporation. Camera power-pack unit. 244,022, 4-12-77, Cl. D16-10.000.
De Lucia, Victor E.; and Ivy, William R., to Torr Laboratories, Inc. Parcel and letter X-ray inspection unit. 244,059, 4-12-77, Cl. D10-104.000.
Designs for Vision, Inc.: *See—*
Feinbloom, Richard E.; and Endrodi, Laszlo, 244,049.
Digital Equipment Corporation: *See—*
Jenkins, Paul A., 244,034.
Dimiceli, Joseph W.; and Labra, Edgardo R., to Utilities Hardware, Inc. Utility pole top insulator bracket. 244,005, 4-12-77, Cl. D8-364.000.
Dr. Molter GmbH: *See—*
Aeschlimann, Hans-Peter, 244,008.
Dunlap, Glenn H.: *See—*
Aul, Robert J.; Babington, Robert S.; Dunlap, Glenn H.; and Zitkus, Wayne J., 244,057.
Eidelberg, Jonah; and Mooney, Thomas, to I-T-E Imperial Corporation. Combined clamping gland and ring for an electrical conduit. 244,026, 4-12-77, Cl. D13-13.000.
Elkhart Rivet & Register Co., Inc.: *See—*
Searer, Glenn V., 244,004.
Elson, Arthur M., to Acme-Hamilton Manufacturing Corporation. Hose. 244,033, 4-12-77, Cl. D23-45.000.
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Feinbloom, Richard E.; and Endrodi, Laszlo, 244,049.
Etablissements Doret S.A.: *See—*
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Fabriques de Chaussures de Sport S.A.R.L.: *See—*
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Feldeisen, Ronald F., to Xerox Corporation. Toner bottle. 244,007, 4-12-77, Cl. D9-2.000.
Forrest, Frank R.: *See—*
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Miller, Paul D.; and Porcelli, V. Lorenzo, 244,021.
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Glass Dimensions, Inc.: *See—*
Perkins, David R., 244,013.
Goldfarb, Adolph E.; and Benkoe, Erwin. Game board. 244,042, 4-12-77, Cl. D34-5.0SS.
Greiss, Rashad Shaker; and Yates, James Stephen, to Boeing Company, The. Passenger service unit panel. 244,018, 4-12-77, Cl. D12-195.000.
Grieb, Joan, to General Electric Company. Wall plate-concentric margin. 244,003, 4-12-77, Cl. D8-350.000.
Grind, Robert E. Sectional boat. 244,015, 4-12-77, Cl. D12-62.000.
Hanson, Richard H.; Roedel, Robert D.; and Forrest, Frank R. Coupling guard. 244,020, 4-12-77, Cl. D15-148.000.
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Jenkins, Paul A., to Digital Equipment Corporation. Housing for a video terminal display unit. 244,034, 4-12-77, Cl. D14-43.000.
Jimenez, Louis Phillip; and Houck, Charles. Combined taper and holder therefor. 244,056, 4-12-77, Cl. D73-1.00R.
Kawata, Yoshiaki; Mori, Daisaku; and Yamamura, Masamichi, to Matsushita Electric Industrial Co., Ltd. Microwave oven. 243,994, 4-12-77, Cl. D7-128.000.
Kayne, Marvin L., to Candle Corporation of America. Jar. 244,009, 4-12-77, Cl. D9-120.000.
Kim, Sang In. Universal adjustable flagpole. 244,014, 4-12-77, Cl. D11-182.000.
Kingmann-White, Inc.: *See—*
Raahauge, Jerald Carl, 244,025.
Kowal, Adolf. Supporting device for slings and the like. 244,058, 4-12-77, Cl. D24-64.000.
Krumlinde, Jockum, to AB Alga. Toy steam engine. 244,046, 4-12-77, Cl. D34-15.00S.
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Lah, Josef; and Gentile, Anthony M. Ski pole handgrip or similar article. 244,045, 4-12-77, Cl. D34-14.00D.
Lallement, Georges. Bracket for garment hangers or the like. 243,978, 4-12-77, Cl. D6-116.000.
Lane Company, Inc., The: *See—*
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Lewis, Cecil. Fishing lure. 244,028, 4-12-77, Cl. D22-27.000.
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Mooney, Thomas; and Veselaski, Stephen, to I-T-E Imperial Corporation. Plug for electrical junction boxes and connectors. 244,027, 4-12-77, Cl. D13-30.000.
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Perkins, David R., to Glass Dimensions, Inc. Hanging container for rooting plants. 244,013, 4-12-77, Cl. D11-147.000.
Pizon, Ernest, to Mecaniplast. Easel type boomerang antenna. 244,038, 4-12-77, Cl. D14-86.000.
Pizon, Ernest, to Mecaniplast. Easel type antenna. 244,039, 4-12-77, Cl. D14-86.000.
Pizon, Ernest, to Mecaniplast. Boomerang antenna. 244,040, 4-12-77, Cl. D14-86.000.
Podunavac, Bozo. Guitar bridge. 244,051, 4-12-77, Cl. D56-1.00A.
Porcelli, V. Lorenzo: *See—*
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Raahauge, Jerald Carl, to Kingmann-White, Inc. Disposable recording pen. 244,025, 4-12-77, Cl. D19-41.000.
Roberts, John E. Computer stand. 243,977, 4-12-77, Cl. D6-85.000.

Roedel, Robert D.: *See—*
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Scott & Fetzer Company, The: *See—*
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Shahid, Wadere S., to Lew Childre & Sons, Inc. Fishing lure. 244,029, 4-12-77, Cl. D22-28.000.

Shimano, Moto; and Nakano, Walter, to Optigon Research & Development Corporation. Camera. 244,054, 4-12-77, Cl. D16-6.000.

Shimano, Moto; and Nakano, Walter, to Optigon Research & Development Corporation. Camera. 244,055, 4-12-77, Cl. D16-6.000.

Stack Heater's Inc.: *See—*
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Stewart, Scott. Cattle dusting bag. 244,041, 4-12-77, Cl. D30-99.000.

Sylla, Jurgen: *See—*
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Takahashi, Osamu, to Tomy Kogyo Co., Ltd. Toy balancing beam. 244,043, 4-12-77, Cl. D34-5.00K.

Telautograph Corporation: *See—*
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Torr Laboratories, Inc.: *See—*
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U.S. Philips Corporation: *See—*
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Van De Poel, Rebertus, to U.S. Philips Corporation. Audio visual record player. 244,053, 4-12-77, Cl. D14-2.000.

Vanderley, Robert J., to Leslie Metal Arts Company, Inc. Closet rod and shelf support bracket. 244,006, 4-12-77, Cl. D8-366.000.

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Warner, Donald E.; and Oyama, George C., to Audiotronics Corporation. Acoustical head-set. 244,037, 4-12-77, Cl. D14-36.000.

Williams, Cole. Picture frame and easel. 243,990, 4-12-77, Cl. D6-236.000.

Wilsch, Herbert; and Sylla, Jurgen, to AGFA-Gevaert, A.G. Photographic slide tray. 244,023, 4-12-77, Cl. D16-26.000.

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Young, William Henry, to Textron, Inc. Packaging container for a bracelet or the like. 244,010, 4-12-77, Cl. D9-195.000.

Zenith Radio Corporation: *See—*
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Zephries, Z. George, to American Home Products Corporation. Spoon or similar article. 243,995, 4-12-77, Cl. D7-137.000.

Zephries, Z. George, to American Home Products Corporation. Spoon or similar article. 243,996, 4-12-77, Cl. D7-137.000.

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Zephries, Z. George, to American Home Products Corporation. Spoon or similar article. 243,998, 4-12-77, Cl. D7-137.000.

Zephries, Z. George, to American Home Products Corporation. Spoon or similar article. 243,999, 4-12-77, Cl. D7-137.000.

Zephries, Z. George, to American Home Products Corporation. Spoon or similar article. 244,000, 4-12-77, Cl. D7-137.000.

Zephries, Z. George, to American Home Products Corporation. Spoon or similar article. 244,001, 4-12-77, Cl. D7-151.000.

Zitkus, Wayne J.: *See—*
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CLASSIFICATION OF PATENTS

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(First number in listing denotes location according to above key. Refer to patent number in body of the Official Gazette to obtain details as to inventor name, location, etc.)

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DESIGN PATENTS

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		244,015		244,059		244,000			244,035	244,027	44 : 244,010
		244,016		244,060		244,001	26	:	244,006	244,049	51 : 243,979
		244,025	9	: 244,002		244,009			244,017	39 : 243,977	243,981
		244,030		244,012		244,014	29	:	243,984	243,985	243,982
		244,031	12	: 244,050		244,047	34	:	243,988	243,992	243,983
		244,036	17	: 243,991		244,048			244,022	244,011	243,987
		244,037		243,993		244,052			244,033	244,019	53 : 244,018
		244,042		243,995	18	: 244,004	36	:	243,980	244,032	55 : 244,020
		244,051		243,996	19	: 244,044			244,003	244,045	244,041

PLANT PATENTS

19	:	4,039		4,040		4,041	39	:	4,038		

U. S. GOVERNMENT PRINTING OFFICE : O - 1977

U.S. DEPARTMENT OF COMMERCE
Juanita M. Kreps, Secretary

PATENT AND TRADEMARK OFFICE
C. Marshall Dann, Commissioner